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ANNUAL JOB COMPLETION REPORT

MARSH ECOLOGY RESEARCH

April 1, 1965 to March 31, 1966

Part I

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Department of Agronomy
Cornell University
Ithaca, New York

20040901160

ANNUAL
JOB COMPLETION REPORT
RESEARCH

STATE OF: New York

NAME: Marsh Ecology Research

PROJECT NO.: W-94-R-8

TITLE: Study of the physical and chemical properties of wate and soils of marshes as the properties relate to the su cess of waterfowl food and cover plants.

PERIOD COVERED: April 1, 1965 to March 31, 1966

ABSTRACT:

Total alkalinity, pH, oxygen and temperature measurements were taken at 6-inch intervals of water depth in each of the 1/10 acre marshes every week during the growing season. The oxygen content ranged from 3.1 to 14.8 ppm during the period from 8:00 A.M. to 5:00 P.M. This change in oxygen level is a reflection of the active biological activity of the marshes.

Total alkalinity determinations showed a significant decrease for all marshes. In 1965, 94 percent of all determinations fell in the range of 0-50 ppm. The average alkalinity for the four marshes of any one depth was around 30 ppm.

The data from soil tests, taken every 3 months from the bottom soils of each of the marshes showed a trend toward higher levels of iron.

The water from the main water supply and the center feeding canal was sampled at weekly intervals throughout the season. These samples were analyzed by spectrographic methods for 15 nutrients. No significant changes from 1964 values were demonstrated.

RECOMMENDATIONS:

This job should be continued next year as outlined in the "Annual Job Report", submitted separately.

OBJECTIVES:

To define requirements for the successful growth of waterfowl food and cover plants on soils flooded from depths of one foot to three feet, at intervals of six inches.

TECHNIQUES:

Discussed in the separate report, "Annual Job Completion Report - Marsh Ecology Research - April 1, 1965 to March 31, 1966".

FINDINGS: Discussed in the separate report.

PREPARED BY: for S. Jervis
by J. Dell
Project Leader

APPROVED BY: Donald D. Foley
Supervising Wildlife Biologist

DATE: March 31, 1966

for P. B. Coleman
Chief, Bureau of Game
by J. Dell, Chief Wildlife Biologist

ANNUAL JOB COMPLETION REPORT

Project Name: Marsh Ecology Research

Project Title: Study of the Physical and Chemical Properties of Water and Soils of Marshes as these Related to the Success of Waterfowl and Cover Plants.

Project Number: W-94-R-8. Job II-B.

Personnel: S. N. Fertig, J. E. Dawson, D. J. Lathwell and Edward Goyette

Period Covered: April 1, 1965 to March 31, 1966

Research Accomplishments of the Year:

I. Physical Facilities:

The 20 marshes involved in the study were maintained in good physical condition during the year. In the spring of 1965, all units were checked for winter damage and, where needed, the dykes repaired and seeded. An application of fertilizer was made on the outside of the dykes and the surrounding sod area to improve the general condition and appearance of the turf. During the summer, a weekly mowing program was maintained and hand pulling or cutting kept invading weed species under control. A power sickle-bar mower was used to trim areas not accessible to the larger tractor mower.

The summer of 1965 was the third year when limited rainfall put a real stress on the main water supply. The desired sampling period of June 1 to September 15 was maintained, but only by very close manipulation of the supply to prevent losses due to seepage and overfilling. Again, as in the fall of 1963 and 1964, earthmoving equipment was used to take more debris and soil from the main marsh. An additional 2 acres of the main marsh was cleared of timber and deepened. With anything resembling normal rainfall, the water supply should be adequate.

To permit rapid visual inspection of the fence line and to facilitate mowing, the two-foot swath on each side of the fence was again treated with soil sterilants. Maintaining a vegetation free area in the fence line not only speeds up mowing operations but permits a rapid daily inspection of the fence for burrowing rodents and any breaks that might occur due to wild or domestic animals.

Also, during the fall of 1965, the remaining brush, bulldozed from the fence line, at the time of construction were cleaned up and burned.

The efforts expended in clearing the main marsh of top soil, organic matter and timber resulted in continued improvement in the quality of water for the 1965 season. The additional work in the fall of 1965 should further improve the objectionable staining of the water supply due to organic matter, suspended material resulting in pump clogging, and the numbers of invading fish.

Using funds from the CRF-1 Aquatic Project, a service building 24 x 60 feet was constructed. This building has a 12 x 20 foot laboratory and area for storing supplies and equipment. The small building previously used as a laboratory will be maintained for storage.

II. Experimental Status:

The experimental program is designed to follow the chemical and physical changes in water and soil which would result in the cessation of growth of plants. Initial treatments included pH and organic matter variables to determine their effect on the rate and nature of chemical and physical changes. There were no changes in the chemical or physical condition of the marshes during 1964 or 1965 which could be attributed to these two variables.

Water samples taken at weekly intervals from the main marsh, the center canal, and marsh No. 9, and analyzed for nutrient level, are reported in Tables 1, 2 and 3. Similar data are reported for the center canal, and ponds 25 and 41 from the CRF-1 project, adjacent to the Marsh Ecology Unit and supplied from the same water supply. Comparing the 1964 and 1965 data, the trend is toward higher levels of iron.

Comparing the values from the main marsh for 1964 and 1965, the pH values show no change but the nitrate, total nitrogen, and phosphorus values are higher for 1965. No significant constant changes occurred with the other nutrients.

Oxygen determinations were continued at 6-inch intervals of depth in each of the marshes every week. The content ranged from 3.1 ppm to 14.8 ppm. This compares favorably with the range of 2.15 to 13.4 ppm in 1964 and 2.3 to 14 ppm in 1963. The lowest oxygen readings normally occur early in the morning and the highest readings in the afternoon (Appendix - Tables 1-20). These changes in oxygen level are to be expected, since the degree of biological activity which is related to light intensity would follow this pattern. The changes in oxygen level with water depth and time of day for selected marshes for the 1965, 1964 and 1963 seasons are shown in Tables 8, 9 and 10.

The average total alkalinity values for all marshes showed a marked decrease in 1965 (Table 11). For 1962, seventy-eight percent of the determinations made showed alkalinities ranging from 50 to 100 parts per million. In 1963, only 35 percent fell in this range, while in 1964, it jumped to 66.5 percent of the total samples. The percentage in this range for 1965 was only 6 percent. Also, in 1964 44 percent of the determinations fell in the 50-59 ppm range, while in 1965, 48 percent fell in the 20-29 ppm range.

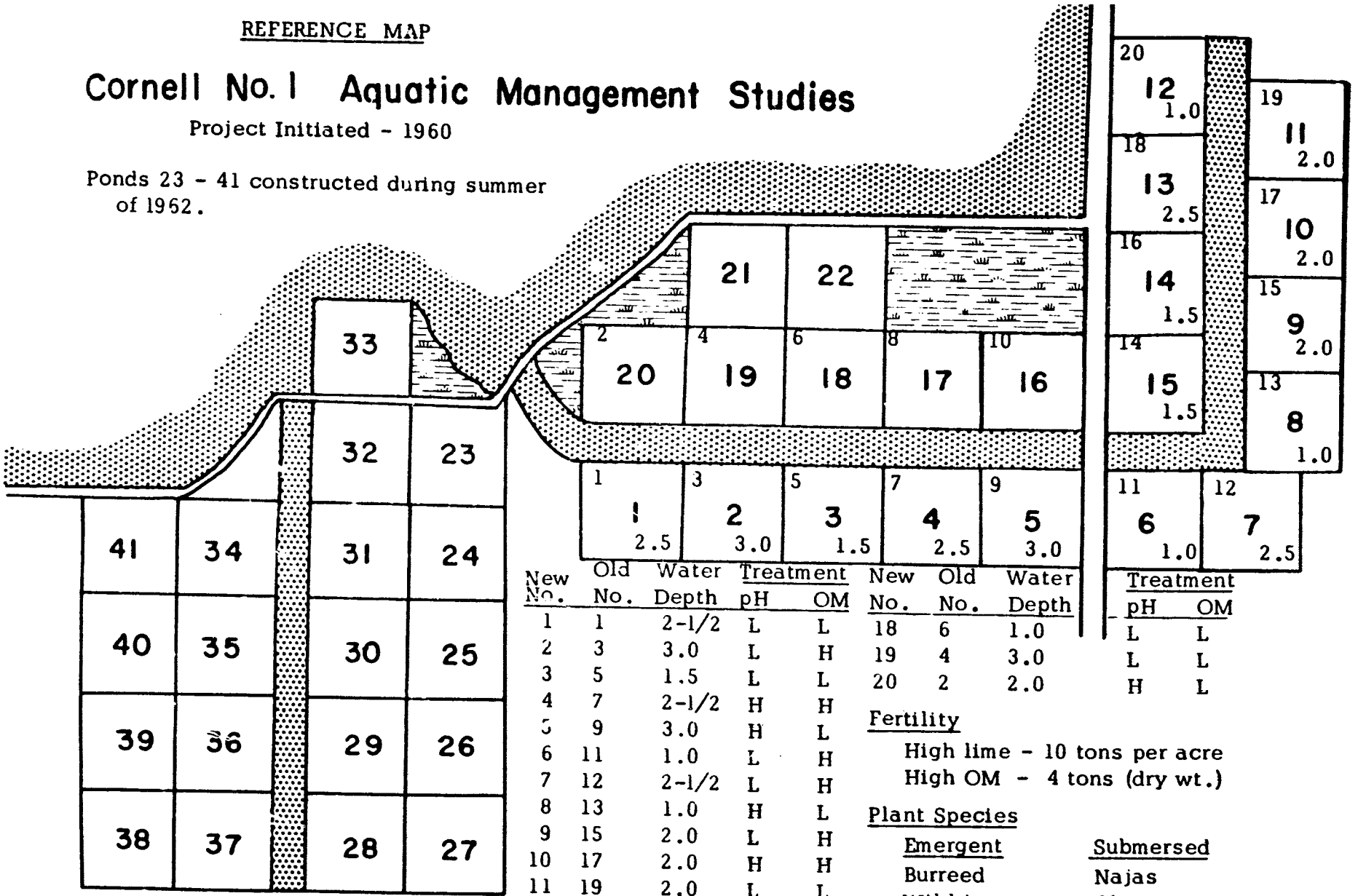
The average seasonal total alkalinity at each water depth is reported in Table 12. All marshes showed lower seasonal total alkalinity in 1965, compared to 1964. The 1965 values reflect the greatest change in alkalinity since the initiation of the study. The average values for the four marshes of each water depth in 1963, 1964 and 1965 are reported in Table 13.

REFERENCE MAP

Cornell No. 1 Aquatic Management Studies

Project Initiated - 1960

Ponds 23 - 41 constructed during summer of 1962.



New No.	Old No.	Water Depth	Treatment pH	Treatment OM
1	1	2-1/2	L	L
2	3	3.0	L	H
3	5	1.5	L	L
4	7	2-1/2	H	H
5	9	3.0	H	L
6	11	1.0	L	H
7	12	2-1/2	L	H
8	13	1.0	H	L
9	15	2.0	L	H
10	17	2.0	H	H
11	19	2.0	L	L
12	20	1.0	H	H
13	18	2-1/2	H	L
14	16	1.5	H	H
15	14	1.5	L	H
16	10	1.5	H	L
17	8	3.0	H	H
18	6	1.0	L	L
19	4	3.0	L	L
20	2	2.0	H	L

Fertility

High lime - 10 tons per acre
High OM - 4 tons (dry wt.)

Plant Species

Emergent	Submersed
Burreed	Najas
Wildrice	Chara
Water smartweed	Sago pondweed
Hardstem bulrush	Water celery

Table 1

Analysis of Water Samples Taken From the Main Marsh (Cornell #1) During the 1965 Growing Season

		P.P.M.															
Date	p.H.	O.M.	NO_3	NH_4	Total N	P	Ca	K	Mg	Na	Zn	Mn	Fe	Cu	B	Al	Sr
6/21	9.0	-	-	.09	-	N.D.	28.	6.0	5.0	2.10	N.D.	N.D.	.140	.020	.020	.170	N.D.
6/28	9.3	-	-	.25	-	0.2	21.	0.1	5.0	1.13	.003	.014	.183	.015	.030	.268	.016
7/6	8.6	<.01	.18	.10	.35	0.3	24.	3.0	7.0	1.31	.009	.014	.224	.005	.011	.234	.020
7/12	8.4	106	.22	.19	.78	0.2	23.	1.0	7.0	1.48	.011	.011	.169	.006	.016	.234	.034
7/19	8..	27	.11	.17	.31	0.4	24.	3.0	6.0	1.57	.046	.023	.130	.017	.028	.164	.029
7/26	9.1	67	.12	.08	1.18	0.2	24.	3.0	6.0	1.60	.012	.014	.107	.010	.024	.150	.015
8/2	9.0	67	.25	<.01	1.09	0.1	25.	0.4	7.0	1.77	.012	.023	.232	N.D.	.008	.250	.040
8/9	8.3	43	.22	.07	3.32	0.3	24.	3.0	6.0	1.83	.015	.011	.265	.010	.018	.258	.034
8/16	8.5	37	.66	.58	1.12	0.1	27.	2.0	8.0	1.83	.009	.014	.202	N.D.	.028	.266	.041
8/23	8.8	37	.36	.38	2.28	0.2	29.	2.0	9.0	2.00	.007	.014	.290	N.D.	.034	.356	.049
8/30	8.6	33	.29	<.01	.33	0.3	31.	2.0	10.0	2.00	.013	.014	.680	N.D.	.046	.640	.039
9/7	7.6	33	.35	<.01	1.09	0.3	31.	2.0	9.0	2.14	.013	.014	.770	N.D.	.031	.760	.046
9/13	8.5	47	.40	.06	2.04	0.1	34.	0.4	10.0	2.07	.019	.011	.445	N.D.	.041	.540	.058
9/20	7.8	13	.19	<.01	2.97	0.1	38.	2.0	11.0	2.00	.007	.011	.193	.011	.038	.286	.065
9/27	8.3	70	.35	<.01	1.05	0.1	33.	N.D.	9.0	1.96	N.D.	.008	.248	.006	.041	.356	.050
10/4	8.0	73	.41	.15	1.27	0.3	31.	1.0	9.0	2.00	.009	.011	.740	.015	.021	.935	.052
10/11	7.7	7	.21	<.01	.76	0.5	32.	0.4	8.0	1.67	.004	.023	1.070	.018	.031	1.250	.043

*N.D. - None Detected

Table 2

Analysis of Water Samples Taken From the Center Canal (Cornell #1) During the 1965 Growing Season

		P.P.M.															
Date	p.H.	O.M.	NO_3	NH_4	Total N	P	Ca	K	Mg	Na	Zn	Mn	Fe	Cu	B	Al	S
6/21	8.7	NR	NR	.09	NR	N.D.	20.	2.0	3.0	1.0	.01	.07	.38	.03	.02	.15	N
6/28	9.2	NR	NR	.08	NR	0.2	23.	0.1	5.0	.788	.003	.014	.095	.015	.030	1.55	.0
7/6	9.0	<.01	.24	.04	.56	0.3	29.	5.0	6.0	1.28	.011	.014	.202	.008	.016	.250	.0
7/12	9.5	60	.20	.06	.97	0.2	25.	2.0	6.0	1.64	.011	.014	.114	.016	.021	.140	.0
7/19	9.3	33	.07	.19	1.00	0.4	20.	2.0	4.0	1.38	.015	.019	.114	.016	.024	.087	.0
7/26	9.6	70	.19	.47	1.87	0.2	24.	2.0	6.0	1.54	.009	.011	.054	.011	.018	.084	.0
8/2	9.5	73	.25	<.01	.82	0.1	25.	0.4	7.0	1.71	.007	.008	.054	N.D.	.016	.100	.0
8/9	9.3	33	.18	<.01	1.74	0.3	24.	3.0	6.0	1.60	.015	.011	.186	.010	.018	.112	.0
8/16	9.3	50	.33	<.01	1.09	0.1	20.	1.0	5.0	1.41	.011	.011	.082	N.D.	.021	.209	.0
8/23	9.1	37	.22	.29	2.00	0.1	26.	2.0	7.0	1.93	.002	.011	.070	.002	.034	.100	.0
8/30	8.6	33	.19	.09	1.00	0.1	28.	1.0	9.0	2.05	.011	.011	.160	N.D.	.034	.170	.0
9/7	7.6	40	.21	<.01	.78	0.1	28.	2.0	9.0	2.10	.010	.008	.100	N.D.	.024	.164	.0
9/13	8.7	33	.33	.01	1.48	N.D.	27.	0.4	9.0	2.05	.010	.008	.153	N.D.	.026	.157	.0
9/20	8.6	20	.28	<.01	2.33	0.1	33.	2.0	10.0	2.05	.006	.008	.091	.010	.028	.145	.0
9/27	8.1	73	.41	.11	.89	0.1	33.	0.4	10.0	2.18	.003	.011	.091	.008	.031	.124	.0
10/4	7.9	77	.44	<.01	1.86	0.2	34.	2.0	9.0	2.32	.020	.008	.202	.013	.006	.176	.0
10/11	8.0	27	.29	<.01	1.48	0.2	34.	0.6	9.0	2.38	.051	.019	.186	.027	.036	.228	.0

*N.D. - None Detected *NR - Not Run

Table 3

Analysis of Water Samples Taken From Pond #9 (Cornell #1) During the 1965 Growing Season

						P.P.M.											
Date	p.H.	O.M.	NO_3	NH_4	Total N	P	Ca	K	Mg	Na	Zn	Mn	Fe	Cu	B	Al	Sr
6/21	9.0	-	-	.09	-	N.D.	15	N.D.	3	1.00	N.D.	N.D.	.100	N.D.	N.D.	.070	.04
6/28	8.3	-	-	.09	-	.2	15	.2	3	.90	.001	.029	.125	.013	.018	.078	.05
7/6	8.6	<.01	.12	.13	.31	.4	18	2.0	5	1.09	.013	.014	.130	.003	.018	.221	.07
7/12	8.3	33	.21	.15	.85	.2	21	2.0		1.19	.009	.028	.146	.005	.018	.118	.08
7/19	8.3	33	.11	.13	.12	.3	22	1.0	5	.99	.027	.032	.224	.011	.024	.150	.08
7/26	9.0	67	.12	.13	1.98	.2	19	1.0	5	1.02	.009	.023	.122	.016	.016	.132	.05
8/2	8.6	77	.19	.27	.54	N.D.	18	N.D.	5	1.09	.005	.028	.130	N.D.	.028	.118	.01
8/9	8.5	37	.18	<.01	1.14	.3	21	3.0	5	1.15	.012	.019	.146	.008	.018	.118	.11
8/16	8.7	37	.52	.11	.72	.1	20	1.0	6	.93	.008	.032	.122	N.D.	.024	.118	.09
8/23	8.4	23	.20	2.13	.89	.1	28	.8	6	1.15	.003	.008	.070	N.D.	.041	.068	.13
8/30	7.9	30	.13	.15	1.00	.1	25	1.0	6	1.15	.012	.011	.114	N.D.	.031	.087	.10
9/7	7.8	20	.23	<.01	.65	.1	21	1.0	7	1.28	.009	.008	.054	N.D.	.034	.062	1.01
9/13	8.3	30	.29	.11	1.42	N.D.	29	N.D.	7	1.28	.006	.011	.202	N.D.	.021	.188	.08
9/20	8.8	10	.30	<.01	.89	N.D.	20	.4	6	1.25	.002	.008	.040	.005	.038	.050	.08
9/27	8.1	70	.33	<.01	.67	.1	25	N.D.	6	1.41	.001	.008	.091	.006	.044	.112	.10
10/4	8.0	70	.28	<.01	1.03	.1	28	0.6	6	1.60	.008	.008	.076	.008	.011	.084	.12
10/11	8.0	<1	.20	.25	1.07	N.D.	25	N.D.	6	1.67	.003	.014	.091	.018	.048	.157	.11

*N.D. - None Detected

Analysis of Water Samples Taken From The Center Canal (23 to 41 Group; Cornell #1) During the 1965 Growing Season

		P.P.H.															
Date	p.H.	O.M.	NO_3	NH_4	Total N	P	Ca	K	Mg	Na	Zn	Mn	Fe	Cu	B	Al	S
6/21	9.1	-	-	0.10	-	1.0	28	7.0	5	1.200	.010	.050	.350	.020	.030	.780	N
6/28	9.5	-	-	0.09	-	.1	18	N.D.	4	.613	N.D.	.010	.043	N.D.	.007	.056	.
7/6	9.0	< 01	.10	.18	1.17	.2	23	3.0	6	1.250	.006	.014	.076	.006	.011	.100	.
7/12	9.7	100	.21	.25	1.34	.2	18	1.0	7	1.540	.012	.011	.091	.006	.280	.068	.
7/19	9.3	27	.08	.10	.31	.4	21	3.0	6	1.380	.024	.023	.091	.018	.026	.112	.
7/26	9.8	77	.10	.01	.64	.4	21	1.0	6	1.510	.008	.011	.054	.005	.018	.068	.
8/2	9.8	77	.25	<.01	.63	.1	22	2.0	6	1.800	.009	.011	.047	N.D.	.024	.084	.
8/9	9.3	33	.15	<.01	.87	.3	21	4.0	5	1.600	.013	.014	.062	.008	.024	.079	.
8/16	9.5	37	.43	<.01	1.09	.1	22	4.0	6	1.510	.010	.011	.062	N.D.	.024	.074	.
8/23	9.5	43	.14	1.06	1.37	.1	22	1.0	7	1.830	.006	.011	.062	N.D.	.041	.079	.
8/30	9.0	33	.15	.06	<.01	.1	27	1.0	9	1.830	.008	.011	.070	N.D.	.018	.100	.
9/7	7.8	30	.24	.07	1.31	.1	23	2.0	8	2.030	.010	.008	.034	N.D.	.036	.087	.
9/13	8.4	33	.31	<.01	1.56	N.D.	24	N.D.	9	2.000	.011	.008	.091	N.D.	.011	.084	.
9/20	8.4	13	.36	<.01	1.75	.1	27	1.0	9	2.070	.003	.008	.076	.005	.046	.013	.
9/27	8.1	80	.36	<.01	1.26	.1	25	N.D.	9	2.000	.002	.011	.082	.011	.041	.016	.
10/4	7.8	73	.32	<.01	1.31	.1	24	.8	9	2.100	.006	.008	.091	.017	.016	.182	.
10/11	7.7	23	.29	<.01	1.17	.1	25	N.D.	9	1.930	N.D.	.014	.146	.013	.044	.150	.

*N.D. - None Detected

Table 5

Analysis of Water Samples Taken From Pond #25 (Cornell #1) During the 1965 Growing Season

		P.P.M.															
Date	p.H.	O.M.	NO_3	NH_3	Total N	P	Ca	K	Mg	Na	Zn	Mn	Fe	Cu	B	Al	Sr
6/21	8.0	-	-	.05	-	N.D.	25	N.D.	6	1.000	N.D.	.050	.100	.020	.020	.100	N.D.
6/28	8.5	-	-	.04	-	.2	23	.1	6	1.088	N.D.	.045	.059	.006	.014	.078	.021
7/6	8.4	[illegible]	.25	.18	1.17	.3	30	3.0	8	1.510	.006	.088	.107	.003	.014	.132	.035
7/12	8.6	10?	.30	.30	1.32	.3	28	2.0	7	1.410	.036	.063	.091	.012	.036	.100	.024
7/19	8.4	20	.19	.06	.40	.4	26	2.0	8	1.480	.036	.088	.100	.016	.064	.112	.038
7/26	8.9	57	.20	2.50	1.40	.3	25	2.0	9	1.450	.009	.028	.062	.005	.048	.079	.022
8/2	8.6	50	.19	<.01	1.10	N.D.	25	1.0	8	1.600	.007	.028	.047	N.D.	.036	.079	.039
8/9	8.5	33	.22	<.01	1.37	.3	25	5.0	7	1.540	.018	.032	.070	.011	.038	.084	.037
8/16	8.7	43	.70	<.01	1.12	N.D.	23	8.0	7	1.480	.003	.028	.047	N.D.	.026	.068	.037
8/23	8.3	33	.27	.30	1.58	N.D.	16	1.0	5	1.120	.004	.008	.027	N.D.	.041	.035	.024
8/30	8.3	30	.22	<.01	.72	.2	29	2.0	9	1.570	.012	.023	.100	N.D.	.051	.084	.037
9/7	7.7	33	.31	<.01	.75	.1	29	2.0	9	1.710	.020	.011	.034	N.D.	.044	.074	.037
9/13	8.2	30	.39	<.01	1.43	N.D.	28	1.0	9	1.900	.011	.019	.076	N.D.	.046	.062	.047
9/20	8.3	13	.36	<.01	1.21	N.D.	29	1.0	8	1.640	.002	.011	.047	.006	.046	.056	.045
9/27	8.2	80	.36	.05	1.26	N.D.	31	N.D.	9	1.600	N.D.	.014	.054	.005	.038	.068	.047
10/4	8.0	73	.35	<.01	1.63	.1	28	1.0	8	2.240	.007	.011	.070	.007	.074	.106	.055
10/11	8.0	30	.31	<.01	1.00	.1	31	.4	8	1.670	.003	.019	.062	.020	.044	.106	.045

*N.D. - None Detected

Table 6

Analysis of Water Samples Taken From Pond #41 (Cornell #1) During the 1965 Growing Season

						P.P.M.											
Date	p.H.	O.M.	NO_3	NH_4	Total N	P	Ca	K	Mg	Na	Zn	Mn	Fe	Cu	B	Al	Sr
6/21	8.1	-	-	.04	-	N.D.	29	N.D.	5	.900	N.D.	N.D.	.170	.020	.030	.170	N.D.
6/28	8.9	-	-	.10	-	.2	14	.4	3	.863	.006	.040	.191	.015	.033	.050	.008
7/6	8.3	<.01	.11	.20	1.05	.3	17	2.0	4	.960	.006	.063	.232	.003	.016	.068	.018
7/12	9.3	83	.20	.08	2.33	.3	16	2.0	4	.750	.020	.032	.122	.010	.034	.062	.009
7/19	8.6	23	.08	.06	.31	4.0	17	2.0	4	.870	.019	.040	.122	.013	.026	.079	.017
7/26	8.6	57	.20	2.50	1.40	.2	19	2.0	5	1.020	.011	.023	.100	.005	.025	.056	.012
8/2	8.9	73	.15	<.01	.86	N.D.	18	N.D.	5	.870	.006	.011	.070	N.D.	.028	.050	.029
8/9	8.6	33	.11	<.01	1.09	.3	18	2.0	5	.930	.011	.019	.107	.007	.028	.056	.025
8/16	9.0	33	.36	<.01	1.26	.1	18	.6	5	.780	.006	.028	.114	N.D.	.026	.068	.028
8/23	8.0	30	.10	1.14	.77	.1	26	2.0	8	1.410	.009	.014	.062	N.D.	.068	.074	.046
8/30	7.9	23	.10	.50	.43	.1	18	.4	6	.900	.010	.014	.100	N.D.	.038	.045	.026
9/7	7.7	7	.18	<.01	<.01	.1	18	2.0	5	.990	.065	.014	.047	N.D.	.036	.068	.021
9/13	7.7	27	.33	<.01	1.49	.1	18	1.0	5	1.250	.019	.014	.122	.005	.044	.050	.032
9/20	7.8	10	.25	<.01	1.40	N.D.	18	.7	5	1.340	.005	.008	.047	.007	.038	.045	.034
9/27	7.5	77	.27	<.01	1.03	N.D.	17	N.D.	6	1.220	N.D.	N.D.	.047	.003	.031	.035	.031
10/4	7.5	67	.22	<.01	.52	.1	17	N.D.	5	1.250	.005	N.D.	.054	.003	.031	.040	.030
10/11	7.5	17	.25	.05	.78	N.D.	18	N.D.	5	1.250	.004	.011	.076	.016	.036	.068	.031

*N.D. - None Detected

Table 8

The Effect of Time of Day and Depth of Water on the Oxygen Content of Some 1/10 Acre Marshes

1965

Marsh No.	Date	Time	Oxygen concentration in ppm as related to water depth						
			Surface	6"	12"	18"	24"	30"	36"
12	6/29/65	10:00 am	7.5	5.3	4.7	-	-	-	-
	6/21/65	10:20 am	8.8	8.6	8.7	-	-	-	-
	8/2/65	11:20 am	10.0	8.7	9.6	-	-	-	-
	7/6/65	1:45 pm	13.1	10.4	11.3	-	-	-	-
	8/23/65	3:00 pm	13.08	11.79	11.79	-	-	-	-
16	9/16/65	9:00 am	3.8	3.2	2.9	3.5	-	-	-
	6/28/65	9:15 am	7.5	6.5	6.8	6.3	-	-	-
	7/7/65	10:05 am	8.6	7.7	8.3	8.1	-	-	-
	6/21/65	1:00 pm	12.0	11.5	11.5	11.5	-	-	-
	8/25/65	4:14 pm	14.7	14.2	13.1	14.4	-	-	-
9	7/27/65	8:45 am	3.1	3.1	4.2	3.5	3.3	-	-
	6/11/65	10:00 am	4.6	4.0	4.7	4.6	4.6	-	-
	8/9/65	11:15 am	7.8	7.7	7.5	7.5	7.3	-	-
	8/16/65	1:00 pm	9.6	10.0	9.2	10.1	10.2	-	-
	6/18/65	3:30 pm	12.8	12.1	12.4	12.3	11.3	-	-
4	7/26/65	9:15 am	6.7	6.3	6.2	7.0	5.9	5.4	-
	8/9/65	10:00 am	6.8	7.5	6.4	6.7	6.4	6.6	-
	7/13/65	10:30 am	8.0	7.9	8.0	7.8	7.8	8.0	-
	6/28/65	2:10 pm	9.4	9.0	9.5	9.9	9.6	9.6	-
	9/7/65	4:00 pm	10.1	9.2	9.1	10.0	9.9	5.7	-
17	6/10/65	9:00 am	6.6	6.4	6.0	5.9	5.9	5.3	3.3
	6/28/65	9:30 am	8.2	7.7	7.7	7.6	7.6	6.8	6.8
	8/2/65	1:00 pm	9.8	8.7	8.8	8.9	9.2	7.8	6.8
	8/16/65	3:30 pm	11.3	11.3	10.8	9.2	11.3	9.2	9.5
	8/23/65	4:30 pm	14.8	12.2	12.4	13.5	13.0	12.4	12.3

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Table 8

The Effect of Time of Day and Depth of Water on the Oxygen Content of Some 1/10 Acre Marshes

1965

Marsh No.	Date	Time	Oxygen concentration in ppm as related to water depth						
			Surface	6"	12"	18"	24"	30"	36"
12	6/29/65	10:00 am	7.5	5.3	4.7	-	-	-	-
	6/21/65	10:20 am	8.8	8.6	8.7	-	-	-	-
	8/2/65	11:20 am	10.0	8.7	9.6	-	-	-	-
	7/6/65	1:45 pm	13.1	10.4	11.3	-	-	-	-
	8/23/65	3:00 pm	13.08	11.79	11.79	-	-	-	-
16	9/16/65	9:00 am	3.8	3.2	2.9	3.5	-	-	-
	6/28/65	9:15 am	7.5	6.5	6.8	6.3	-	-	-
	7/7/65	10:05 am	8.6	7.7	8.3	8.1	-	-	-
	6/21/65	1:00 pm	12.0	11.5	11.5	11.5	-	-	-
	8/25/65	4:14 pm	14.7	14.2	13.1	14.4	-	-	-
9	7/27/65	8:45 am	3.1	3.1	4.2	3.5	3.3	-	-
	6/11/65	10:00 am	4.6	4.0	4.7	4.6	4.6	-	-
	8/9/65	11:15 am	7.8	7.7	7.5	7.5	7.3	-	-
	8/16/65	1:00 pm	9.6	10.0	9.2	10.1	10.2	-	-
	6/18/65	3:30 pm	12.8	12.1	12.4	12.3	11.3	-	-
4	7/26/65	9:15 am	6.7	6.3	6.2	7.0	5.9	5.4	-
	8/9/65	10:00 am	6.8	7.5	6.4	6.7	6.4	6.6	-
	7/13/65	10:30 am	8.0	7.9	8.0	7.8	7.8	8.0	-
	6/28/65	2:10 pm	9.4	9.0	9.5	9.9	9.6	9.6	-
	9/7/65	4:00 pm	10.1	9.2	9.1	10.0	9.9	5.7	-
17	6/16/65	9:00 am	6.6	6.4	6.0	5.9	5.9	5.3	3.3
	6/28/65	9:30 am	8.2	7.7	7.7	7.6	7.6	6.8	6.8
	8/2/65	1:00 pm	9.8	8.7	8.8	8.9	9.2	7.8	6.8
	8/16/65	3:30 pm	11.3	11.3	10.8	9.2	11.3	9.2	9.5
	8/23/65	4:30 pm	14.8	12.2	12.4	13.5	13.0	12.4	12.3

Table 9

The Effect of Time of Day and Depth of Water on the Oxygen Content of Some 1/10 Acre Marshes

1964

Marsh No.	Date	Time	Oxygen concentration in ppm as related to water depth						
			Surface	6"	12"	18"	24"	30"	36"
12	9/2/64	8:35 am	5.5	5.6	5.9	-	-	-	-
	8/18/64	10.40 am	7.8	7.8	7.5	-	-	-	-
	7/7/64	1:00 pm	10.5	10.2	10.3	-	-	-	-
	8/4/64	3:45 pm	10.9	11.6	12.9	-	-	-	-
	6/11/64	6:15 pm	11.8	11.7	11.6	-	-	-	-
16	8/26/64	8:50 am	6.6	6.6	6.7	6.8	-	-	-
	9/10/64	10:45 am	7.9	7.9	8.0	7.8	-	-	-
	8/11/64	1:15 pm	10.3	10.3	10.3	10.3	-	-	-
	8/18/64	2:50 pm	10.8	10.8	10.9	10.9	-	-	-
9	7/29/64	8:45 am	5.5	5.2	5.0	5.0	5.1	-	-
	6/18/64	10:40 am	8.9	8.7	8.9	8.7	8.6	-	-
	9/9/64	2:15 pm	9.1	9.6	9.4	9.0	3.2	-	-
	6/11/64	4:40 pm	11.4	11.3	11.5	11.3	10.7	-	-
4	7/16/64	8:50 am	8.0	8.0	7.9	8.1	8.3	8.4	-
	8/4/64	10:50 am	8.7	8.7	8.7	8.7	8.7	8.7	-
	7/1/64	12:30 pm	8.2	8.4	8.4	9.2	9.0	3.2	-
	9/18/64	3:45 pm	10.7	10.4	10.4	10.4	10.5	10.7	-
17	6/12/64	9:25 am	9.2	9.0	9.2	9.5	10.0	8.6	7.5
	8/11/64	12:50 pm	10.2	10.1	9.9	10.0	6.7	10.5	9.1
	7/20/64	2:00 pm	9.9	9.5	12.5	12.2	13.0	7.8	1.5
	6/29/64	3:00 pm	10.1	9.9	9.8	11.3	12.6	[illegible].4	9.7

Table 10

The Effect of Time of Day and Depth of Water on the Oxygen Content on Some 1/10 Acre Marshes

1963

Marsh No.	Date	Time	Oxygen concentration in ppm as related to water depth						
			Surface	6"	12"	18"	24"	30"	36"
12	7/2/63	9:00 am	3.1	2.5	2.5	-	-	-	-
	8/16/63	11:40 am	9.6	8.9	9.8	-	-	-	-
	7/30/63	1:55 pm	10.8	11.4	11.5	-	-	-	-
	8/21/63	3:15 pm	10.1	10.8	12.1	-	-	-	-
	8/8/63	4:40 pm	12.2	12.75	12.1	-	-	-	-
16	7/24/63	9:00 am	10.3	9.7	9.6	9.6	-	-	-
	6/26/63	11:20 am	8.4	8.5	8.7	8.6	-	-	-
	6/15/63	1:15 pm	9.4	9.6	9.7	9.6	-	-	-
	8/16/63	2:40 pm	10.1	9.7	11.3	10.7	-	-	-
	7/30/63	3:45 pm	11.9	11.8	11.9	11.5	-	-	-
9	8/22/63	8:40 am	9.2	9.3	9.2	10.2	6.3	-	-
	8/16/63	10:20 am	10.0	9.9	10.0	9.6	9.4	-	-
	6/14/63	1:00 pm	10.6	10.5	10.4	10.5	10.5	-	-
	8/26/63	2:55 pm	12.3	12.4	13.2	12.7	10.9	-	-
4	7/3/63	8:00 am	6.9	6.7	6.7	6.5	6.6	6.4	-
	7/29/63	10:50 am	9.1	9.1	9.2	9.2	9.3	11.1	-
	8/26/63	11:27 am	10.0	10.3	10.3	10.8	11.3	11.7	-
	8/22/63	12:55 pm	11.1	10.8	11.4	11.8	11.7	12.3	-
17	7/31/63	9:00 am	8.1	8.5	8.1	8.1	8.1	7.9	8.1
	6/5/63	10:45 am	9.0	8.5	8.5	9.2	9.3	9.4	7.6
	6/19/63	11:40 am	9.9	9.7	9.7	10.5	10.5	10.5	10.2
	8/9/63	1:40 pm	10.1	10.0	10.0	9.7	11.0	10.8	9.8
	8/16/63	4:00 pm	10.5	10.0	10.1	11.6	11.4	10.6	11.5

Table 11

Range of Total Alkalinity Values for 1962 to 1965

Range in Total Alkalinity as ppm of $CaCO_3$	Number of determinations falling in each range				
	1962	1963	1964		1965
100 +	6	0	21		0
90-99	29	3	7		1
80-89	91	11	31		0
70-79	79	39	83		2
60-69	253	109	185		23
50-59	530	281	671		57
40-49	262	727	498		176
30-39	11	108	4		472
20-29	1	1	0		635
Total	1282	1279	1500	(10-19)	28
				(0 - 9)	1
					1395

Table 12

Changes in Average Seasonal Total Alkalinity from 1962 to 1965 Season

Marsh Ecology Project

Pond No.	Pond Depth (feet)	Average Seasonal Total Alkalinity from 1962 to 1965 Expressed as ppm of $CaCO_3$			
		1962	1963	1964	1965
6	1.0	55.0	58.5	71.1	44.4
8	1.0	52.8	41.2	50.6	32.9
12	1.0	51.7	63.3	70.6	40.7
18	1.0	52.8	45.3	59.3	35.2
3	1.5	55.2	46.6	53.6	31.0
14	1.5	52.3	52.7	78.6	47.3
15	1.5	48.6	48.3	59.3	35.3
16	1.5	54.5	46.5	56.2	33.3
9	2.0	54.6	47.9	61.2	29.1
10	2.0	54.9	49.2	63.1	28.2
11	2.0	71.4	43.9	53.4	33.9
20	2.0	69.9	51.8	57.1	28.5
1	2.5	69.4	43.2	46.0	28.8
4	2.5	73.4	53.0	65.2	29.8
7	2.5	59.9	46.9	54.0	29.8
13	2.5	44.3	40.9	49.0	26.9
2	3.0	70.0	43.0	50.0	32.6
5	3.0	63.8	52.6	50.6	27.4
17	3.0	54.1	53.3	59.2	30.4
19	3.0	55.3	51.7	48.3	24.7
33	4.0	--	--	77.6	

Table 13

Water Depth (feet)	Average alkalinity values (ppm) for four ponds of each depth		
	1963	1964	1965
1'	52.1	62.9	38.3
1-1/2'	51.0	61.9	36.7
2'	48.2	58.7	29.9
2-1/2'	46.0	53.6	28.8
3'	50.2	52.0	28.5

The data from soil tests are reported in Table 14. The trend in these samples is toward higher levels of iron. No significant changes are evident in organic matter, pH, P, Ca, Mg, K or Mn.

II. Vegetation Growth and Appearance:

A. Submersed Species:

The four submersed species initially planted in the marshes were: Najas, Chara, Sago Pondweed and Water Celery. These species were rated three times during the season by visually estimating the density of each compared to the marsh having the maximum density. The ratings are shown in Table 15.

Comparing the 1965 and 1964 ratings, significant changes have occurred. The density for most species is higher in 1965 compared to 1964. Previous observations on vegetation growth, both submersed and emergent, have no doubt been of little significance due to the activity of wildlife. The 1966 season should give a better evaluation of the recovery of plant growth.

B. Emergent Species:

The four emergent species made in the initial plants were: burreed, wild rice, water smartweed and hardstem bulrush. All species continue to be more prevalent at the shallower depths of 1-2 feet. The hardstem bulrush, burreed and wild rice have essentially disappeared from the marshes maintained at 2-1/2 and 3-foot depths. The 1965 evaluations would tend to support previous suspicions of wildlife competition. This suspicion is supported by the stand of wild rice in marshes where it has not been recorded since 1963.

V. Weather Data:

Recording hydrothermographs were located at the north and south ends of the experimental area. In addition, a rain gauge, wind recorder, max-min thermometers, and relative humidity instruments were located at the south station. A weather summary covering the period April 1-November 30 is included under Appendix I.

Table 14.
1965
The Results of Soil Analyses Taken From the .1 Acre Marshes at Grand Lake No. 1

Marsh No.	Date	Organic Matter	pH	P	NO_3 N	NH_3 N	Ca	Mg	K	Mn	Fe	Al
1	5/12/65	0.6	7.5	<1	5	3.0	25,000	1,300	35	190	75	25
	7/1/65	0.4	7.2	<1	10	7.0	15,500	1,375	20	110	45	15
	10/12/65	0.6	7.4	<1	15	6.0	15,600	1,150	25	168	70	15
	1/7/66	0.3	7.4	<1	<1	<1	20,000	960	30	170	75	5
2	5/12/65	1.2	7.7	<1	8	3.0	19,000	1,500	29	155	80	25
	7/1/65	0.6	7.4	<1	10	5.0	15,000	1,275	21	132	140	28
	10/12/65	0.7	7.7	<1	10	3.0	9,800	770	15	100	75	15
	1/7/66	0.1	7.8	<1	<1	<1	18,400	1,200	35	155	30	4
3	5/12/65	0.5	7.8	<1	2	5.0	24,000	1,550	35	145	35	15
	7/1/65	0.7	7.6	<1	10	2.0	15,500	1,375	18	88	60	15
	10/12/65	0.5	7.8	1	20	4.0	17,600	1,000	28	118	80	20
	1/7/66	0.2	7.8	<1	5	<1	18,000	1,520	35	145	12	5
4	5/12/65	1.8	7.8	<1	4	5.0	18,500	1,400	34	170	70	15
	7/1/65	1.1	7.5	<1	15	7.0	16,000	1,100	23	120	150	25
	10/12/65	0.8	7.8	1	12	3.0	6,600	305	25	50	42	10
	1/7/66	0.2	7.8	<1	<1	5	19,200	1,200	35	175	64	8
5	5/12/65	0.5	7.7	<1	12	9.0	17,500	975	30	195	275	45
	7/1/65	0.6	7.7	<1	4	3.0	12,000	900	15	88	50	13
	10/12/65	1.0	7.7	1	40	10.0	10,200	880	33	176	460	65
	1/7/66	0.8	7.7	<1	40	<1	13,600	700	40	165	800	45
6	5/12/65	2.1	7.7	<1	8	1.0	14,000	1,250	27	130	80	15
	7/1/65	1.3	7.6	<1	10	8.0	18,000	1,500	25	124	50	13
	10/12/65	2.9	7.6	1	10	6.0	12,000	1,150	30	144	72	20
	1/7/66	0.7	7.7	<1	2	1	18,800	900	45	220	150	18
7	5/12/65	1.3	7.7	<1	18	7.5	18,500	1,070	37	195	245	30
	7/1/65	1.0	7.6	<1	10	7.0	13,500	1,225	20	108	100	25
	10/12/65	0.8	7.7	1	25	5.0	17,200	1,000	35	168	120	25
	1/7/66	0.5	7.8	<1	25	<1	18,800	900	40	210	280	25
8	5/12/65	0.5	7.9	<1	12	3.0	20,000	1,500	35	160	50	15
	7/1/65	0.7	7.7	<1	20	2.0	17,500	1,250	25	132	170	25
	10/12/65	0.6	7.8	1	8	3.0	12,000	1,080	30	114	57	25
	1/7/66	0.7	7.8	<1	20	<1	18,000	900	35	230	220	23
9	5/12/65	1.2	7.8	<1	18	9.0	19,000	1,200	40	245	230	25
	7/1/65	3.1	7.6	<1	5	8.0	9,750	1,000	25	124	140	28
	10/12/65	0.7	7.5	1	27	3.0	7,600	700	30	156	290	35
	1/7/66	1.8	7.6	1	15	<1	9,000	880	30	215	340	37
10	5/12/65	-	-	-	-	-	-	-	-	-	-	-
	7/1/65	4.7	7.5	<1	20	7.0	21,250	600	45	132	300	28
	10/12/65	1.0	7.8	1	8	6.0	12,000	1,000	25	152	90	20
	1/7/66	3.6	7.6	<1	<1	<1	18,000	700	35	155	44	5

Table 14 (cont'd)

Marsh No.	Date	Organic Matter	pH	P	NO_3 N	NH_3 N	Ca	Mg	K	Mn	Fe	Al
11	5/12/65	0.7	7.8	<1	15	5.0	20,000	1,350	35	170	165	25
	7/1/65	0.6	7.7	<1	10	8.0	18,000	1,375	25	162	145	28
	10/12/65	0.5	7.7	1	10	3.0	16,800	1,060	20	130	120	20
	1/7/66	0.6	7.8	<1	15	<1	18,000	900	35	210	160	23
12	5/12/65	8.4	7.5	<1	12	6.0	14,000	550	17	90	280	15
	7/1/65	1.5	7.7	<1	10	3.0	16,500	1,150	25	132	115	28
	10/12/65	6.9	7.4	<1	23	15.0	16,000	710	25	126	290	25
	1/7/66	6.3	7.6	<1	20	<1	20,000	800	30	125	300	28
13	5/12/65	0.9	7.7	<1	20	7.5	15,000	1,050	25	220	320	40
	7/1/65	0.9	7.6	1	10	5.0	13,500	1,250	35	132	210	33
	10/12/65	0.9	7.5	1	38	7.0	8,000	780	20	144	440	85
	1/7/66	1.6	7.6	<1	30	4	6,000	800	20	110	340	40
14	5/12/65	6.1	7.5	<1	13	3.0	17,500	1,050	30	140	165	15
	7/1/65	3.9	7.7	<1	10	7.0	17,500	1,000	30	158	160	28
	10/12/65	2.5	7.6	<1	15	8.0	24,000	520	35	130	85	10
	1/7/66	0.6	7.7	<1	25	<1	18,000	860	40	220	340	27
15	5/12/65	0.5	7.8	<1	5	1.0	8,500	950	5	50	10	10
	7/1/65	2.4	7.7	<1	10	5.0	17,500	1,300	28	152	135	25
	10/12/65	4.0	7.6	<1	6	3.0	16,000	1,160	20	140	125	25
	1/7/66	1.3	7.7	<1	5	<1	18,400	920	45	200	250	25
16	5/12/65	0.7	7.8	<1	10	7.0	20,000	1,500	27	200	90	15
	7/1/65	0.7	7.7	<1	1	2.0	14,250	1,075	28	102	100	25
	10/12/65	0.6	7.7	<1	18	4.0	15,000	1,150	25	148	145	25
	1/7/66	0.7	7.8	<1	25	<1	14,800	1,200	30	220	340	33
17	5/12/65	1.3	7.8	<1	17	10.0	22,500	1,175	30	220	250	20
	7/1/65	0.7	7.7	1	2	5.0	17,000	1,250	30	180	125	30
	10/12/65	0.6	7.8	<1	12	6.0	16,000	1,160	28	172	140	22
	1/7/66	0.8	7.8	<1	15	<1	9,600	700	25	120	210	25
18	5/12/65	0.5	7.9	<1	3	3.0	26,000	1,450	25	180	45	10
	7/1/65	0.7	7.7	1	2	5.0	22,500	1,000	33	108	80	12
	10/12/65	0.5	7.9	<1	15	5.0	16,800	1,320	25	140	92	25
	1/7/66	0.5	7.9	<1	25	4	23,200	830	45	220	145	20
19	5/12/65	0.5	7.9	<1	6	2.5	20,000	1,475	25	170	35	20
	7/1/65	0.4	7.8	<1	2	7.0	16,250	1,450	20	108	30	12
	10/12/65	0.5	7.8	<1	12	4.0	17,600	1,240	30	156	110	20
	1/7/66	0.7	7.8	<1	15	1	19,200	770	55	235	260	25
20	5/12/65	0.7	7.9	<1	5	14.0	30,000	1,175	30	210	45	10
	7/1/65	0.5	7.8	1	5	5.0	30,000	700	38	115	135	25
	10/12/65	0.4	7.8	<1	12	3.0	16,000	1,140	25	130	75	15
	1/7/66	0.6	7.8	<1	25	<1	14,000	670	50	160	410	50

Table 15.

Visual Evaluation of Stand Density by Species, Cornell #1, Marshes 1 to 20

1965

Plant Species	Date	Marsh Number (New) and Stand Rating by Dates[1/]																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Sparaganium	July 1	0	0	0	0	0	2	0	0	0	0	0	10	0	3	9	8	0	0	0	0
	July 22	0	0	0	0	0	2	0	0	0	0	0	10	0	1	9	7	0	0	0	0
	Aug. 20	1	1	1	1	1	4	1	1	1	1	1	10	1	1	9	6	1	1	1	1
Zizania	July 1	0	1	0	0	0	2	3	2	5	3	4	7	1	9	10	8	8	2	0	0
	July 22	0	1	0	0	0	2	3	1	3	2	2	6	1	7	10	9	9	1	0	0
	Aug. 20	0	1	0	0	0	2	2	1	3	2	2	5	1	7	10	9	9	1	0	0
Polygonum	July 1	1	0	2	2	0	9	0	7	2	4	2	7	0	10	4	0	1	1	1	3
	July 22	1	0	2	1	0	4	0	10	1	3	1	5	0	8	2	0	1	0	1	1
	Aug. 20	2	1	2	1	0	7	0	10	0	4	1	5	0	7	1	0	1	0	1	1
Scirpus	July 1	4	0	7	0	4	7	3	6	2	4	5	7	2	10	1	3	0	10	1	2
	July 22	4	0	7	0	5	8	3	6	2	5	6	8	3	10	2	5	0	10	1	2
	Aug. 20	4	1	6	1	4	8	3	5	2	4	5	8	3	10	2	4	1	10	1	2
Najas	July 1	5	5	5	2	1	1	1	10	0	7	1	0	10	0	0	4	3	10	4	1
	July 22	5	5	5	1	1	1	1	9	0	3	2	1	4	0	0	8	3	10	4	3
	Aug. 20	5	5	4	2	1	2	1	10	1	3	3	1	3	0	0	8	4	7	3	3
Chara	July 1	5	3	6	4	1	10	2	6	6	0	5	8	1	6	2	8	6	3	2	6
	July 22	3	3	6	4	1	10	6	7	7	0	5	9	1	7	1	8	8	3	3	7
	Aug. 20	3	3	6	6	1	10	6	6	7	0	3	9	1	8	1	7	8	2	4	8
P. pectinatus	July 1	1	4	1	1	10	1	4	3	3	10	2	0	6	1	5	2	3	3	4	0
	July 22	1	2	1	0	10	1	5	3	3	10	1	0	6	1	5	1	2	2	4	0
	Aug. 20	1	1	1	0	10	0	5	2	2	10	1	0	4	1	3	2	2	2	3	0

1/ Rating based on 0 to 10, with zero indicating an absence of the species and 10 representing the marsh with the maximum density. All other values based on the marsh with maximum density

Table 15 (cont'd)

Plant Species	Date	Marsh Number (New) and Stand Rating by Dates																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Vallisneria	July 1	6	4	4	9	1	9	5	9	10	2	6	9	4	1	7	2	6	2	1	1
	July 22	4	3	3	6	1	9	5	10	9	4	8	9	1	3	7	5	6	2	1	1
	Aug. 20	5	5	4	8	6	9	6	9	10	3	7	8	2	4	6	5	6	1	4	1
P. natans	July 1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
	July 22	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
	Aug. 20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
P. nodosus	July 1	0	0	5	4	0	0	0	0	0	0	7	0	6	0	0	0	0	10	0	0
	July 22	0	0	2	1	0	0	0	0	0	0	7	0	1	0	0	0	0	10	0	0
	Aug. 20	0	0	2	1	0	0	0	0	0	0	7	0	1	0	0	0	0	10	0	0
P. gramineus	July 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	July 22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	Aug. 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Elodea	July 1	0	0	0	0	0	3	5	0	0	0	2	0	0	0	10	0	0	0	0	0
	July 22	0	0	0	0	0	1	2	0	0	0	0	0	0	0	10	0	0	0	0	0
	Aug. 20	0	0	0	0	0	1	4	0	0	0	0	0	0	0	10	0	0	0	0	0
P. crispus	July 1	0	0	0	0	0	0	0	10	0	0	0	5	0	0	0	0	0	0	0	0
	July 22	0	0	0	0	0	0	0	10	0	0	0	3	0	0	0	0	0	0	0	0
	Aug. 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. richardsonii	July 1	0	0	0	2	2	0	3	0	1	7	1	0	2	1	10	1	0	4	0	8
	July 22	0	0	0	2	0	2	1	0	1	10	1	0	3	1	5	1	0	2	0	0
	Aug. 20	0	0	0	3	0	2	1	0	1	10	1	0	5	0	6	1	0	3	0	0
P. illinoensis	July 1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	July 22	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Aug. 20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15 (cont'd)

Plant Species	Date	Marsh Number (New) and Stand Rating by Dates																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P. foliosus	July 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	July 22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Aug. 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteranthera dubia	July 1	0	0	0	0	10	2	4	0	0	0	0	0	8	1	0	1	0	0	0	0
	July 22	0	0	0	0	10	2	2	0	0	0	0	0	6	0	0	1	0	0	0	0
	Aug. 20	0	0	0	0	10	0	1	0	0	0	0	0	6	0	0	0	0	0	0	0

Table 1

Cornell #1 - Marsh Ecology Project

Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

April 1965

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
April	1	.08	100	37.5	18	27.8	68
	2	0	260	35.5	25	30.2	94
	3	0	180	37	20	28.5	52
	4	0	110	43	20	31.5	65
	5	0	90	50	20	35.0	50
	6	.21	250	57	25	41.0	45
	7	.02	230	42	36	39.0	98
	8	0	100	45.5	34.5	40.0	76
	9	0	190	44	31	37.5	92
	10	0	160	51	33.5	40.8	75
	11	.27	270	55	30.5	42.8	55
	12	trace	410	62	37	49.5	86
	13	trace	330	37	32	34.5	96
	14	0	160	52	32	42.0	77
	15	.24	250	50.5	31	40.8	60
	16	0	270	45.5	33	39.2	80
	17	.38	190	43	29.8	36.4	85
	18	.37	100	38	28	33.0	90
	19	0	130	46.5	30	38.2	81
	20	trace	100	56	30	43.0	75
	21	.11	240	64	30.5	47.2	63
	22	trace	140	51	35	43.0	92
	23	0	170	53	30	41.5	66
	24	0	110	46	29	37.5	61
	25	.22	300	53	28.5	40.8	77
	26	.16	170	51	34	42.5	100
	27	.06	100	44	39	41.5	94
	28	trace	90	55	36	45.5	100
	29	0	180	59	32.5	45.8	69
	30	0	176	69	42	55.5	46
	Sum	2.10	5526	1473	909	1191	2268
	Mean	.07	184.2	49.1	30.3	39.7	75.6

1/ All readings taken between 8 - 9:00 A.M. and except for relative humidity, cover the previous 24 hour period.

2/ Readings taken at 80 inches above the ground.

Table 2

Cornell #1 - Marsh Ecology Project

Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

May 1965

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
May	1	0.01	74	66	33	49.5	62
	2	0	90	74.5	45.5	60.0	66
	3	0	180	85	54	69.5	59
	4	0.03	120	67	46	56.5	70
	5	0	30	66	39	52.5	61
	6	0.28	190	72	37	54.5	51
	7	0.40	260	61	43	52.0	100
	8	0	230	68	43	55.5	100
	9	0.65	140	81	54	67.5	79
	10	0.01	50	80.5	59	69.8	76
	11	0	190	66	49.5	57.8	63
	12	0	120	69	41	55.0	74
	13	0	190	58	44.5	51.2	82
	14	0	100	62	33	47.5	56
	15	0	130	80	40	60.0	52
	16	0.14	180	82	55.5	68.8	60
	17	0.04	220	65	46.5	55.8	90
	18	0	160	61	45	53.0	87
	19	0.10	100	70	43	56.5	54
	20	0	120	65	38	51.5	56
	21	0	230	76	36	56.0	59
	22	0	130	73	58	65.5	86
	23	0	90	64	44.5	54.2	90
	24	0	100	73.5	35	54.2	60
	25	0	110	78	50	64.0	80
	26	0.01	110	84.5	67	75.8	77
	27	0.17	120	80	59	69.5	76
	28	0	140	65	52	58.5	67
	29	trace	110	56	39	47.5	74
	30	0	60	56	35	45.5	68
	31	0	110	66	34.5	50.3	60
	Sum	2.17	4203.6	2170	1401.2	1785.6	2194.8
	Mean	0.05	135.9	70.0	45.2	57.6	70.8

1/ All readings taken between 8-9:00 A M. and except for relative humidity, cover the previous 24 hour period.
2/ Readings taken at 80 inches above the ground.

Table 3

Cornell #1 - Marsh Ecology Project

Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

June 1965

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
June	1	.43	50	62	34	48.0	72
	2	.58	80	56	47.5	51.8	100
	3	trace	160	57	35	46.0	68
	4	0	100	66	34.5	50.2	94
	5	0	90	77	42	59.5	64
	6	0	110	85	53.5	69.2	70
	7	.09	120	85	65	75.0	80
	8	.08	60	81	66	73.5	86
	9	.22	100	80	61	70.5	82
	10	0	140	77	53	65.0	76
	11	0	130	69.5	43	56.2	62
	12	0	170	80	45	62.5	94
	13	0	160	54.5	42	48.2	68
	14	0	90	53	47.5	50.2	86
	15	.04	40	61.5	42	51.8	88
	16	0	150	69	44	56.5	82
	17	.23	60	61	50	55.5	69
	18	.02	90	68	49	58.5	100
	19	0	120	77	49	63.0	70
	20	0	120	82.5	51	66.8	50
	21	0	80	82	64	73	56
	22	0	70	82	61	71.5	70
	23	.56	160	84	59	71.5	93
	24	0	170	69.5	50.5	60.0	65
	25	0	124	67.5	46	56.8	80
	26	0	85	76	41	58.5	65
	27	0	161	80	50.5	65.2	75
	28	0	140	88.5	61	74.8	65
	29	.03	150	84	67.5	75.8	80
	30	trace	110	71	51.5	61.2	100
	Sum	2.40	3390	2187	1506	1848	2310
	Mean	.08	113.	72.9	50.2	61.6	77.0

1/ All readings taken between 8-9:00 A.M. and except for relative humidity, cover the previous 24 hour period.

2/ Readings taken at 80 inches above the ground.

Table 4

Cornell #1 - Marsh Ecology Project

Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

July 1965

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
July	1	0	105	76	43	59.5	75
	2	.30	265	80.5	47	63.8	52
	3	.14	110	80	58	69.0	100
	4	0	60	80	52	66.0	72
	5	trace	180	84	53	68.5	77
	6	0	150	70	53	61.5	56
	7	.31	250	72	48.5	60.2	54
	8	0	100	79	63	71.0	88
	9	.15	190	86.5	58.5	72.5	78
	10	0	120	76	56	66	100
	11	0	90	72.5	48	60.2	62
	12	0	100	78	45.5	61.8	61
	13	0	150	88	53	70.5	62
	14	0.72	110	87	66	76.5	64
	15	0	110	77	56	66.5	62
	16	0	76	82.5	50	66.2	73
	17	.59	87	80.5	60	70.2	60
	18	.02	87	74	56	65.0	100
	19	0	140	67	50.5	58.8	82
	20	0	100	68	45	56.5	90
	21	0	80	74	41	57.5	62
	22	trace	120	72.5	51	61.8	61
	23	0	80	86	61	73.5	80
	24	0	130	88	62	75.0	88
	25	0	90	82	63	72.5	81
	26	0	140	77	56	66.5	80
	27	0	90	76	53	64.5	64
	28	trace	90	69	50	59.5	70
	29	0	50	66	50	58	80
	30	0	80	75	44	59.5	80
	31	0	130	81	47.5	64.3	98
	Sum	2.17	3661.1	2405.6	1639.9	2024.3	2312.6
	Mean	.07	118.1	77.6	52.9	65.3	74.6

1/ All readings taken between 8-9:00 A.M. and except for relative humidity, cover the previous 24 hour period.
2/ Readings taken at 80 inches above the ground.

Table 5

Cornell #1 - Marsh Ecology Project

Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

August 1964

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
August	1	.48	200	69	62	65.5	80
	2	0	170	78	59	67.5	100
	3	0	105	71	54	62.5	88
	4	0	55	70	48	59	70
	5	0	100	83	51	67	52
	6	0	90	91	61	76	78
	7	0	200	92	68	80	78
	8	.01	160	85	70	77.5	86
	9	0	140	86	67	76.5	88
	10	.23	140	74	56	65	89
	11	0	75	76	49	62.5	100
	12	0	105	87	49	68	74
	13	.23	70	79	65	72	66
	14	trace	90	85	61	73	100
	15	0	70	96	63	79.5	100
	16	0	90	87	63	75	80
	17	trace	70	93	58	75.5	77
	18	.16	60	86	65	75.5	100
	19	.06	150	72	60	66	94
	20	0	110	73	52	62.5	94
	21	0	100	73	48	60.5	86
	22	0	140	66	61	63.5	88
	23	0	120	71	47	59	94
	24	0	80	76	42	59	76
	25	0	190	81	59	70	72
	26	.37	100	78	61	69.5	84
	27	0	190	79	60	69.5	88
	28	0	190	70	46	58	70
	29	.45	190	59	44	51.5	76
	30	trace	170	61	35	49	84
	31	.46	100	66	52	59	50
	Sum	2.48	3760.3	2411.8	1736.	2073.9	2591.6
	Mean	.08	121.3	77.8	56	66.9	83.6

1/ All readings taken between 8-9:00 A.M. and except for relative humidity, cover the previous 24 hour period.

2/ Readings taken at 80 inches above the ground.

Table 6

Cornell #1 - Marsh Ecology Project

Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

September 1965

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
September	1	.52	100	62	48	55	100
	2	trace	300	70	46	58	100
	3	0	115	74	43	58.5	82
	4	0	215	73	52	62.5	94
	5	0	170	72	56	64	84
	6	trace	80	73	53	63	94
	7	0	30	81	56	68.5	100
	8	.12	60	72	54	63	82
	9	.12	280	75	51	63	100
	10	.18	230	86	66	76	100
	11	.01	60	64	44	54	96
	12	.36	120	57	48	52.5	100
	13	.27	70	60	52	56	100
	14	trace	40	77	56	65.5	100
	15	trace	200	73	58	66.5	96
	16	.02	120	59	50	54.5	94
	17	.23	170	73	55	64	100
	18	0	30	82	62	72	100
	19	0	130	85	67	76	100
	20	.49	120	86	63	75.5	94
	21	0	110	87	66	76.5	98
	22	0	210	88	66	77	85
	23	.17	90	82	60	71.	96
	24	.35	90	66	46	56	100
	25	0	100	61	40	50.5	92
	26	0	190	69	42	55.5	81
	27	0	120	50	32	41.	63
	28	0	190	59	30	44.5	60
	29	.06	60	65	49	57.	86
	30	.35	360	67	52	59.5	100
	Sum	3.30	4101	2148	1566	1857	2778
	Mean	.11	136.7	71.6	52.2	61.9	92.6

1/ All readings taken between 8-9:00 A.M. and except for relative humidity, cover the previous 24 hour period.

2/ Readings taken at 80 inches above the ground.

Table 7

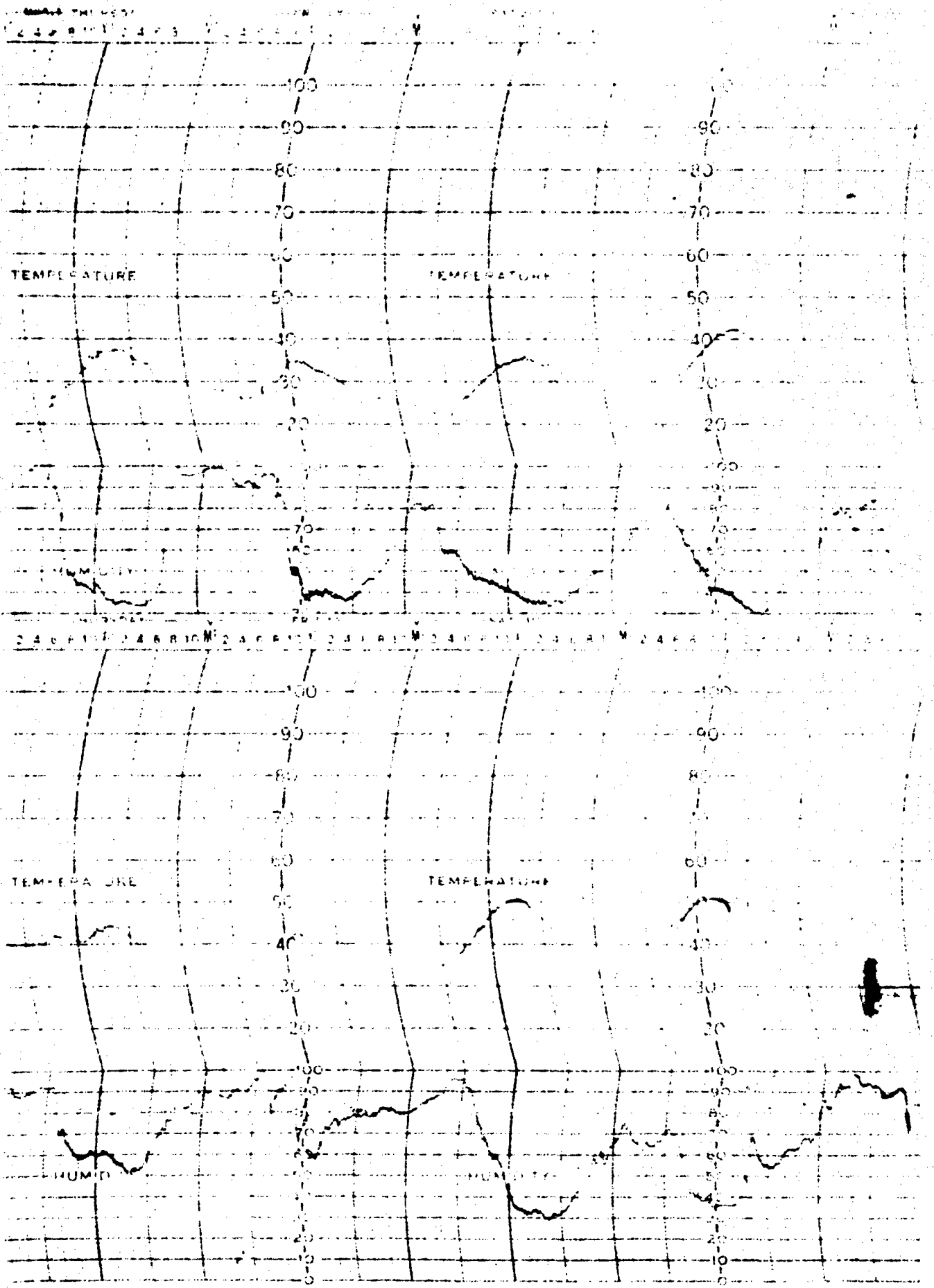
Cornell #1 - Marsh Ecology Project

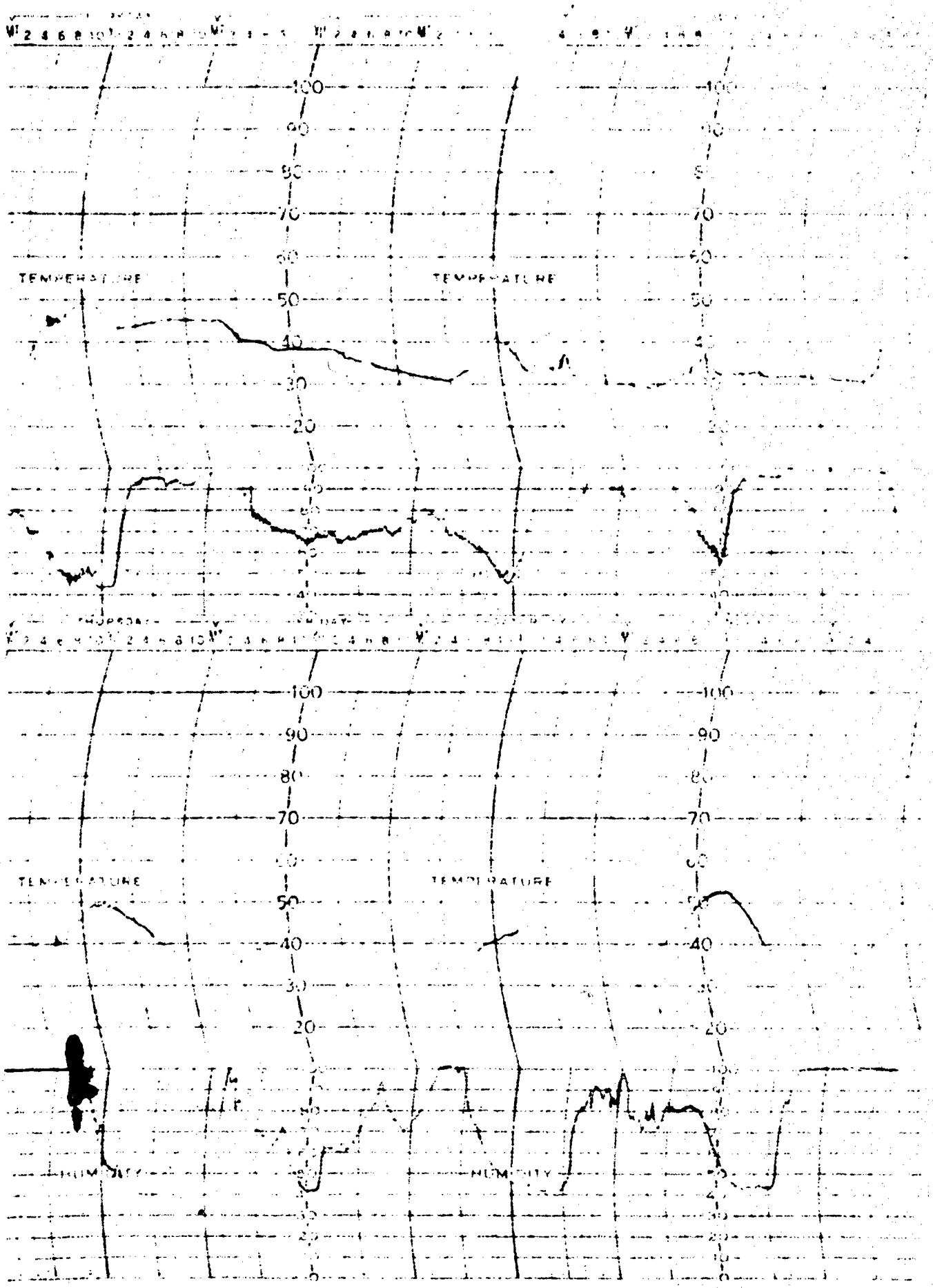
Monthly Meteorological Summary[1/]
Air Temperature (in degrees F.)

October 1965

Month	Day	Rainfall in inches	Wind velocity in MPD[2/]	Air temperature - Thermometer			Percent Relative Humidity
				Maximum	Minimum	Mean	
October	1	.15	250	72	53	62.5	100
	2	0	170	60	43	51.5	84
	3	trace	370	58	40	49	81
	4	0	340	40	31	35.5	76
	5	0	170	39	26	32.5	74
	6	0	70	45	26	37.5	98
	7	.71	160	55	40	47.5	70
	8	.05	180	57	46	51.5	100
	9	.15	110	56	46	51	84
	10	.01	50	49	37	43	100
	11	.16	140	59	37	48	100
	12	.01	120	58	41	49.5	82
	13	trace	110	54	36	45	92
	14	.01	120	67	35	51	90
	15	.01	170	67	47	57	100
	16	trace	70	51	33	42	100
	17	0	100	60	28	44	100
	18	0	100	67	42	54.5	78
	19	0	100	72	42	57	78
	20	0	50	72	46	59	84
	21	.02	60	71	52	61.5	92
	22	.82	80	60	48	54	100
	23	.13	50	57	40	48.5	76
	24	.12	240	41	36	38.5	92
	25	0	150	52	34	43	70
	26	.01	80	56	42	49	58
	27	.08	190	46	38	42	74
	28	.04	150	39	24	31.5	80
	29	trace	120	37	23	30	100
	30	0	190	60	31	45.5	42
	31	0	100	65	40	52.5	40
	Sum	2.48	4358.6	1742.2	1184.2	1463.2	2594.7
	Mean	.08	140.6	56.2	38.2	47.2	83.7

1/ All readings taken between 8-9:00 A.M. and except for relative humidity, cover the previous 24 hour period.
2/ Readings taken at 80 inches above the ground.


TEMPERATURE
TEMPERATURE
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY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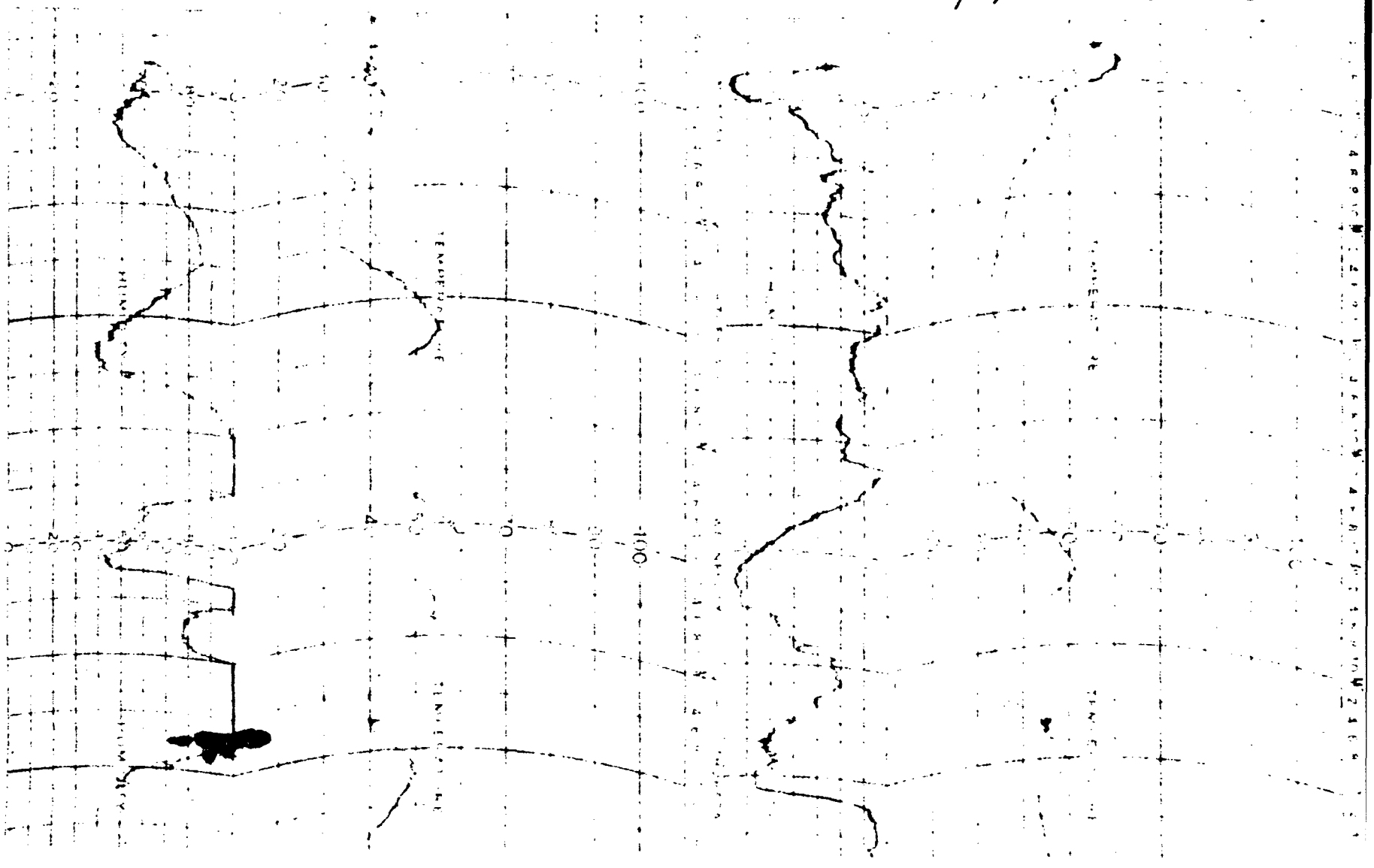
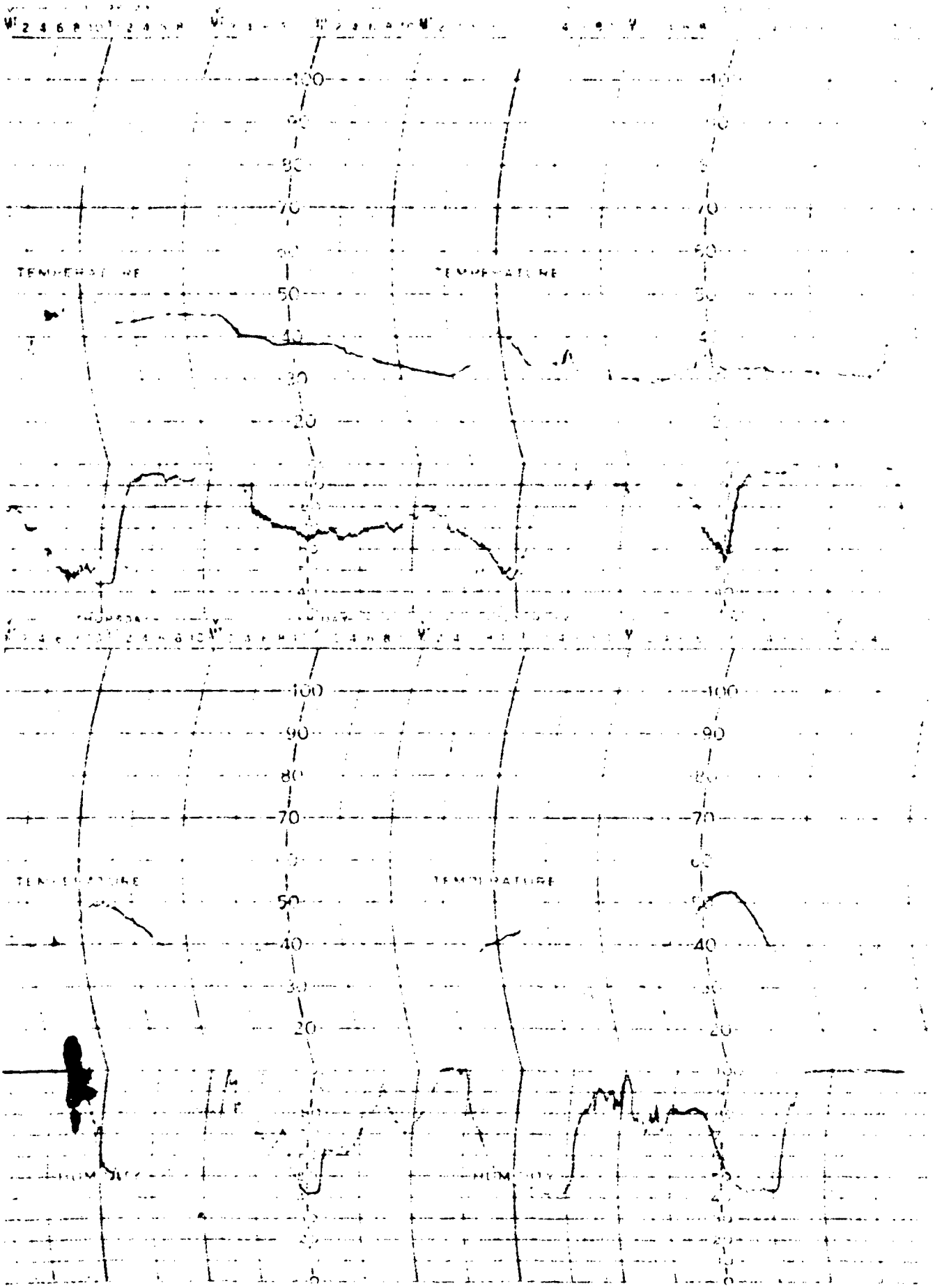
TEMPERATURE
HUMIDITY
HUMIDITY


4/12/65


100
90
80
70
60
50
40
30
20
10
0

df 63°
76%
8:35
5/1/65

m: 69°
59% RH
8:40

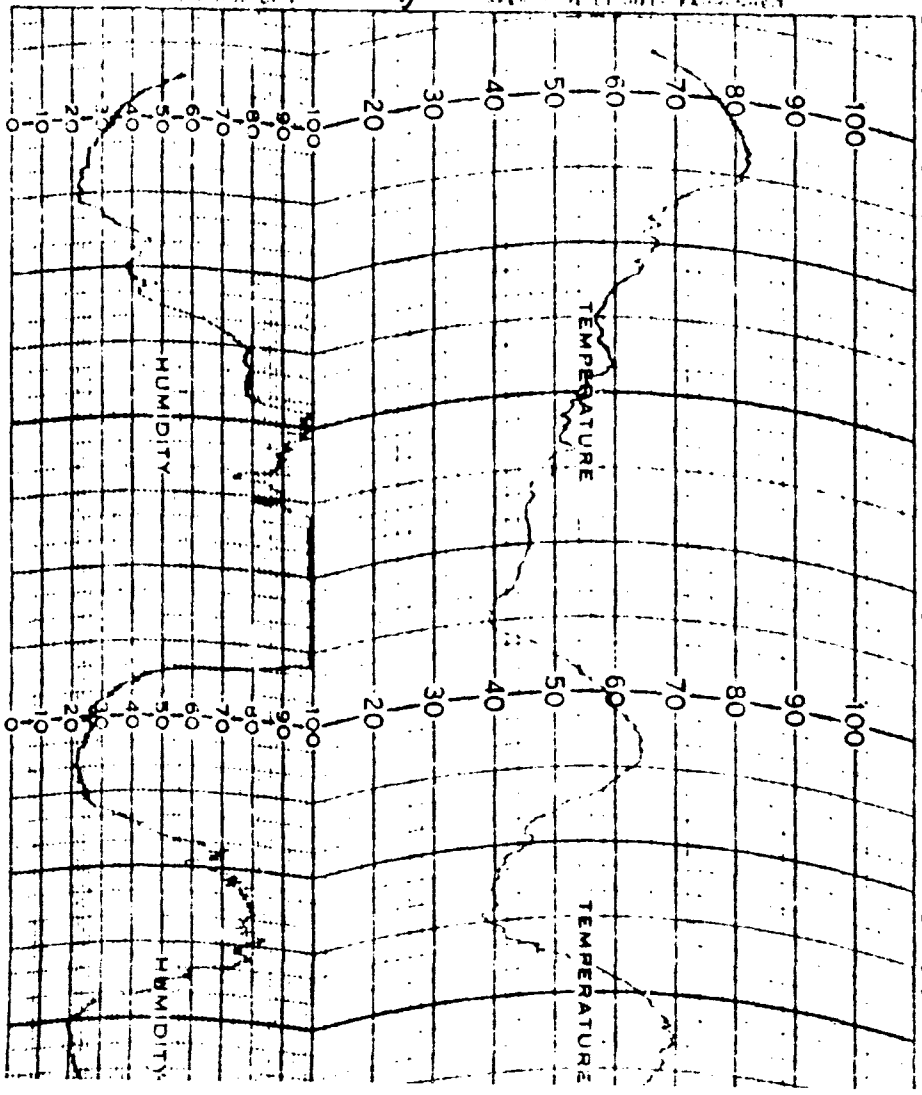
59% RH
69°
8:40

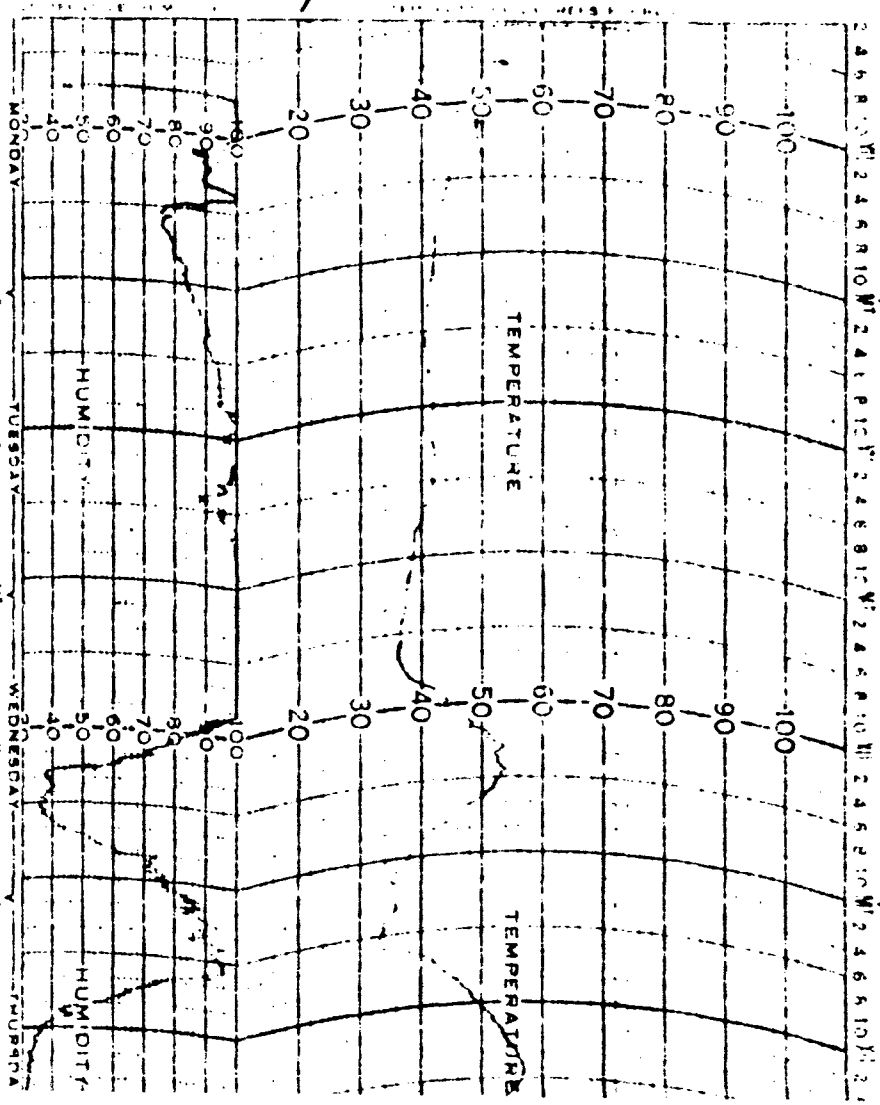
m. 37°
100% R.H.
8:40 EDT

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2, MARYLAND U.S.A.

INSTR. NO. [illegible] DATE May 3 1965 STATION South #1

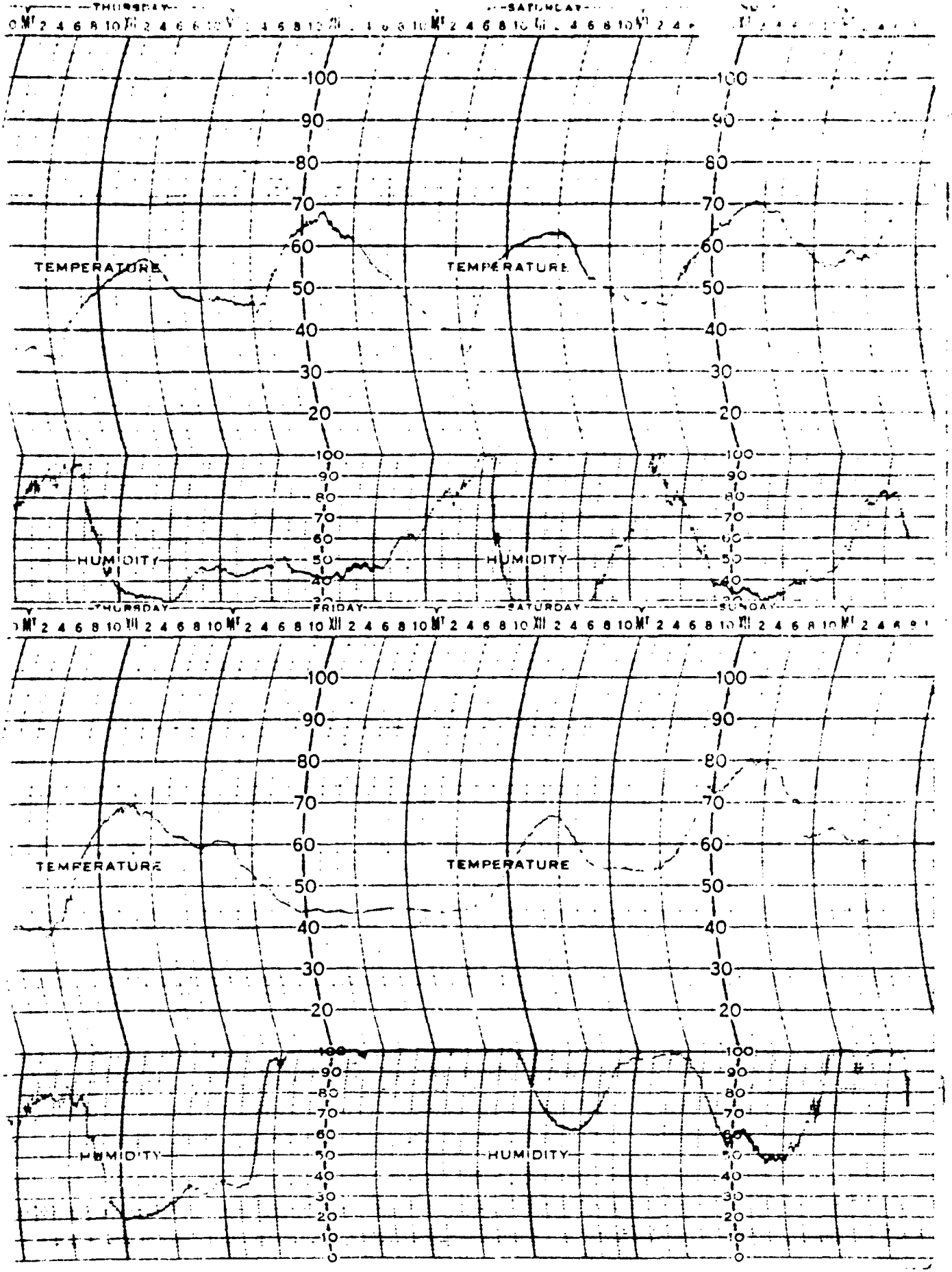


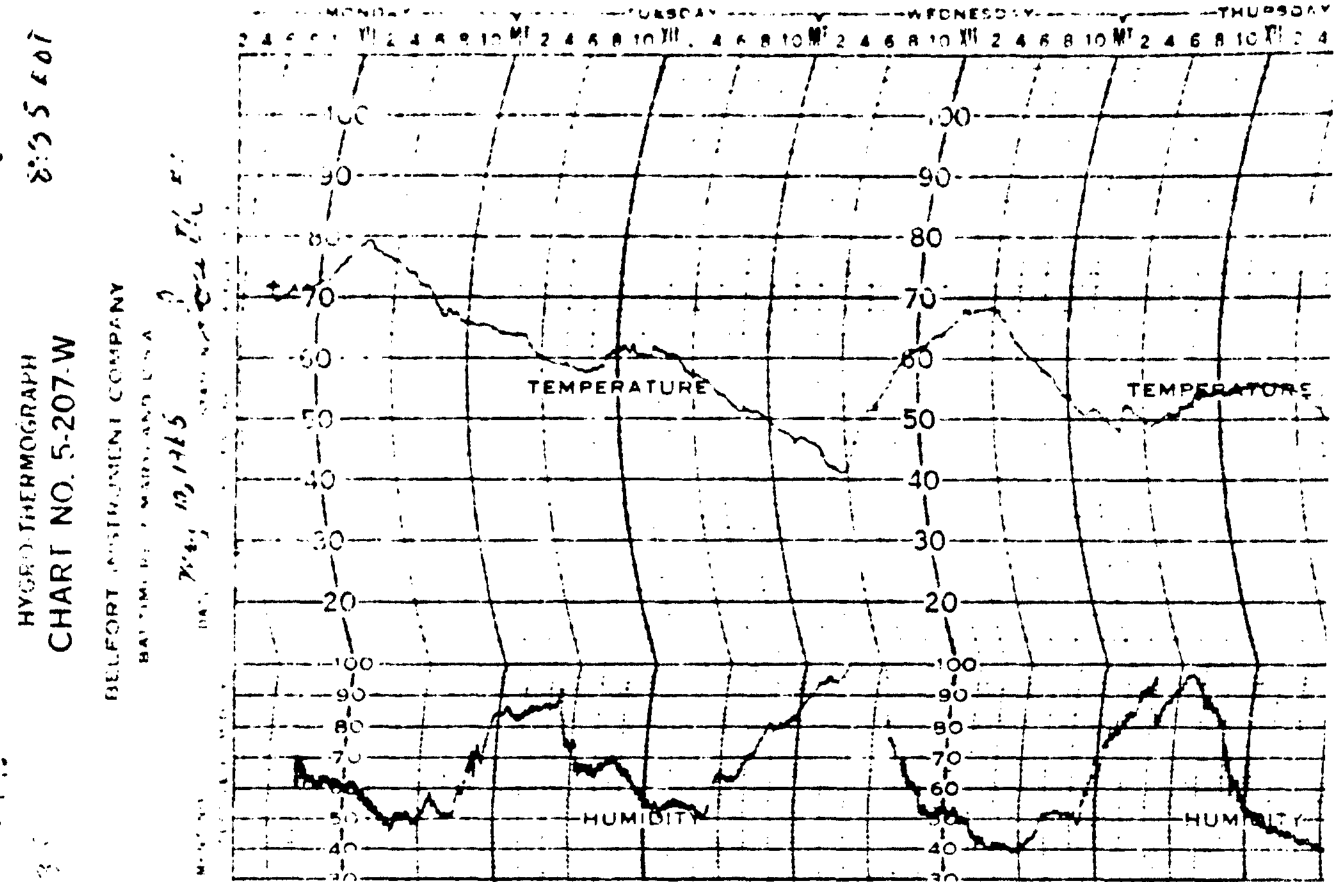


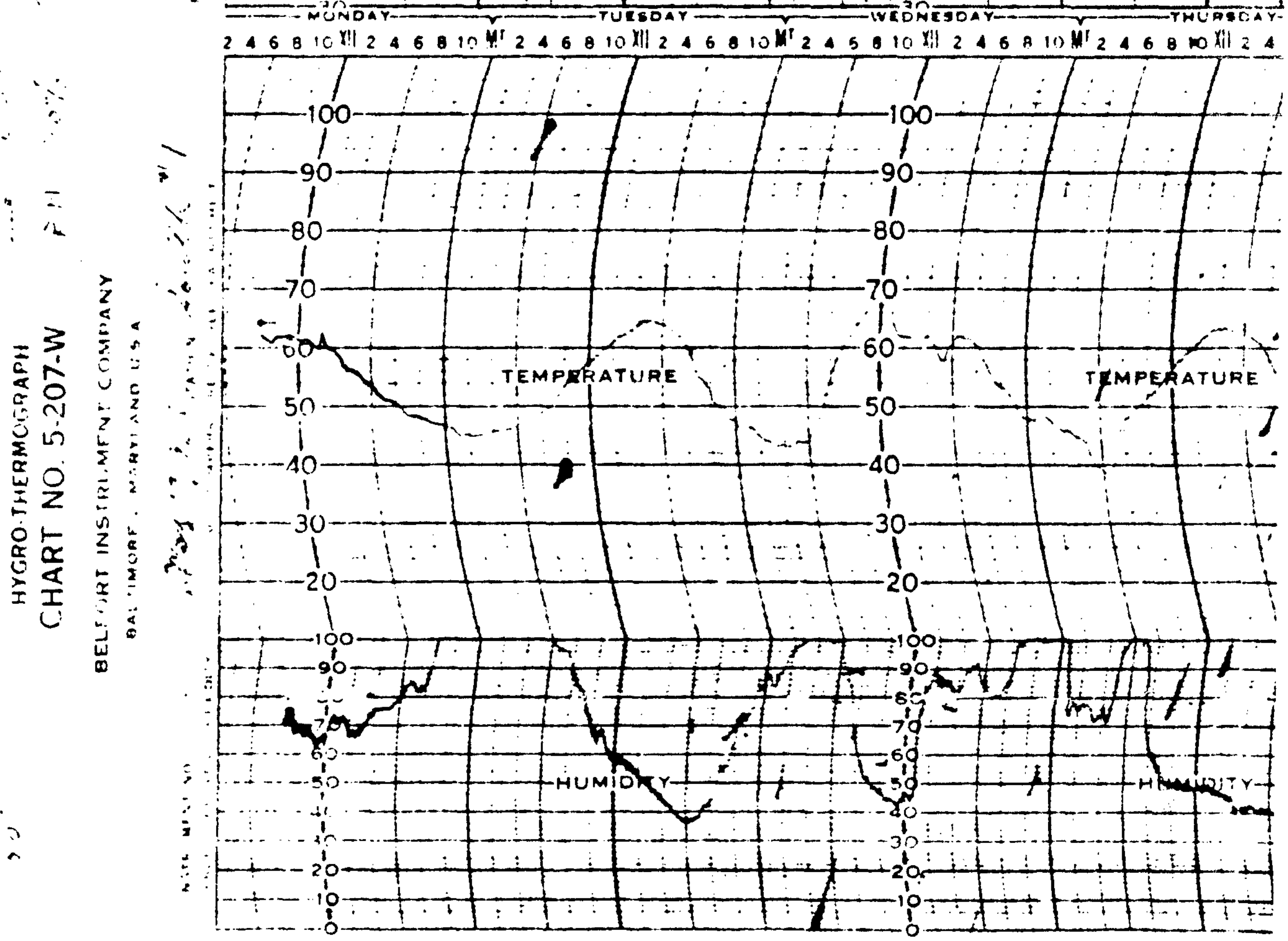
HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2, MARYLAND U.S.A.

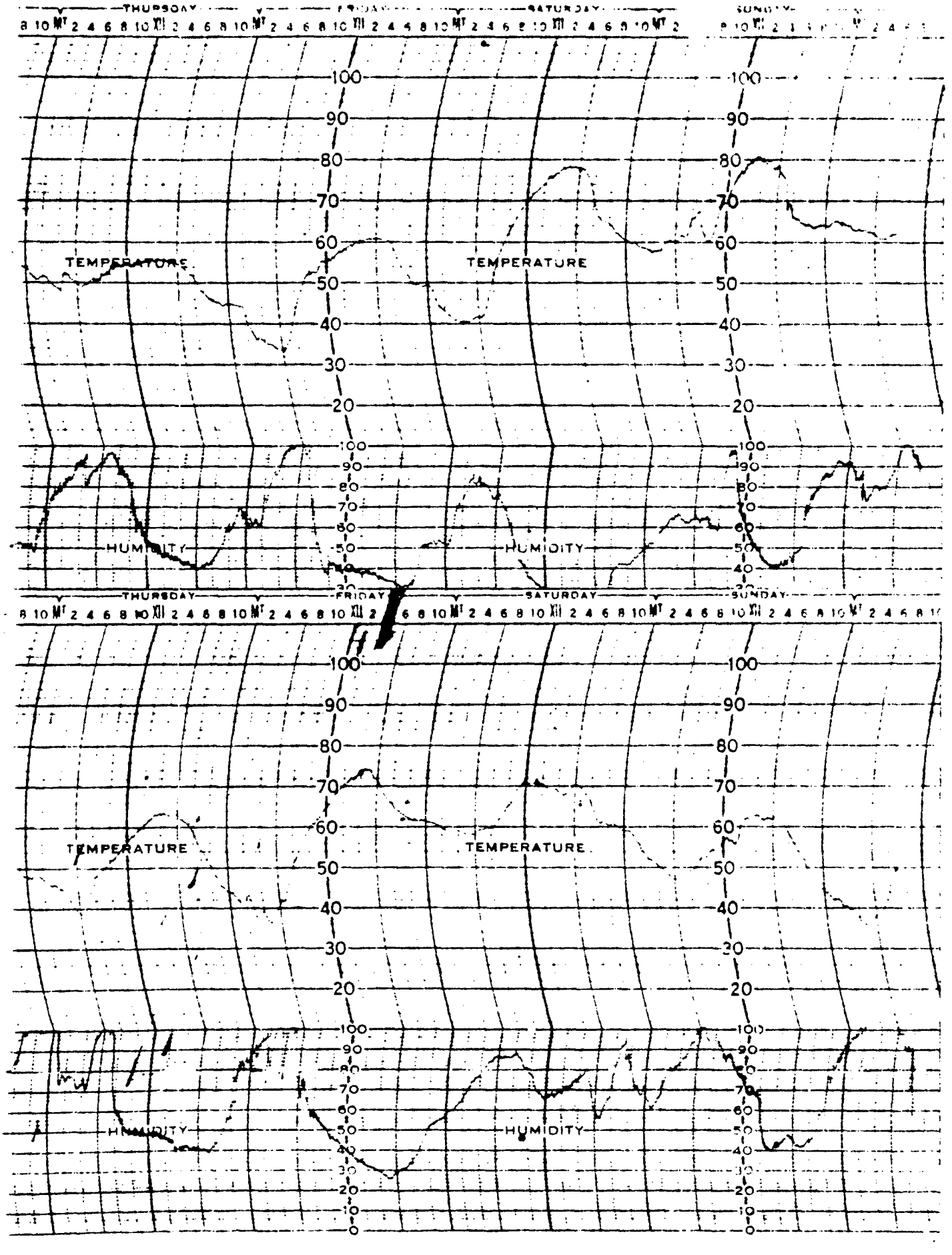
DATE April 26 1965 STATION South #1


THURSDAY
SATURDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY


HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
BALTIMORE, MARYLAND U.S.A.
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
TEMPERATURE
HUMIDITY


HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
BALTIMORE, MARYLAND U.S.A.
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
TEMPERATURE
HUMIDITY

A


THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY

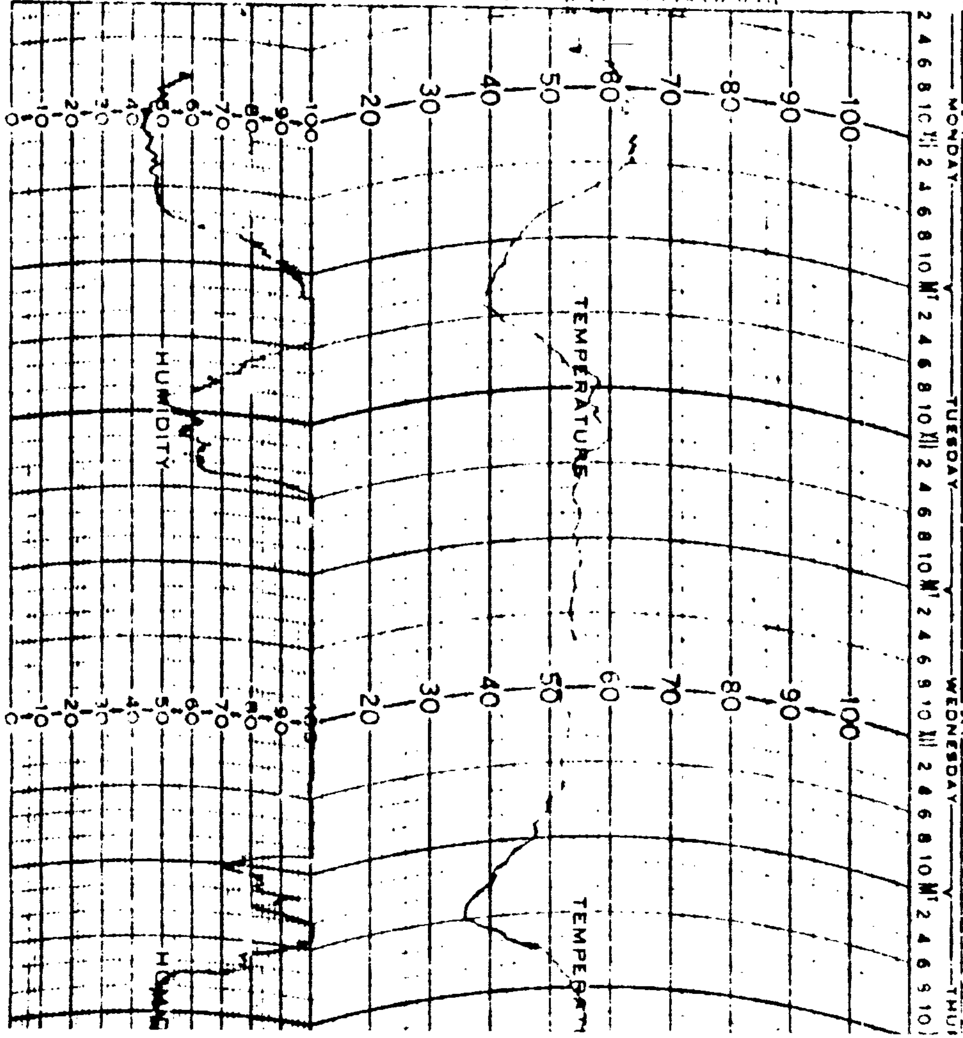
ff 75
80%
9:00

on: 53°
60%
8:35

3
9%
35

HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
BALTIMORE, MARYLAND, U.S.A.

May 31, 1965 South #1



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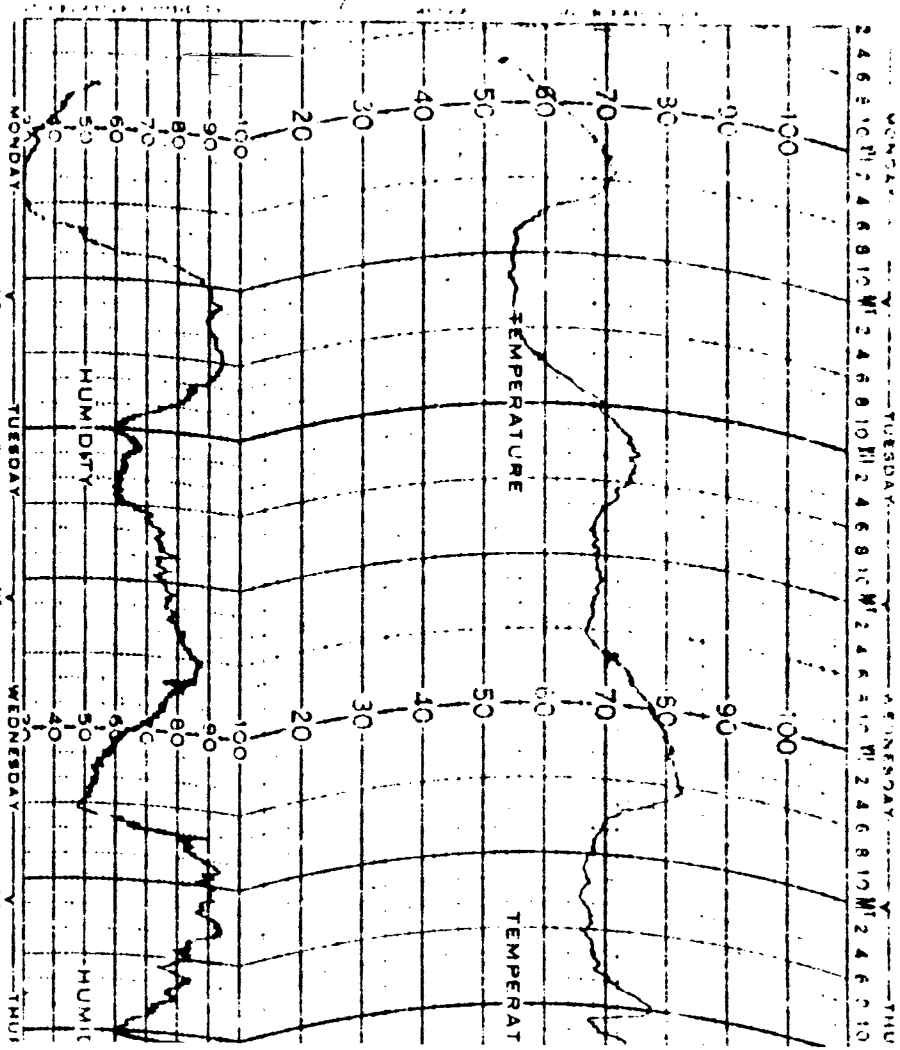
BELFORT INSTRUMENT COMPANY
BALTIMORE, MARYLAND, U.S.A.

May 24, 1965 South #1



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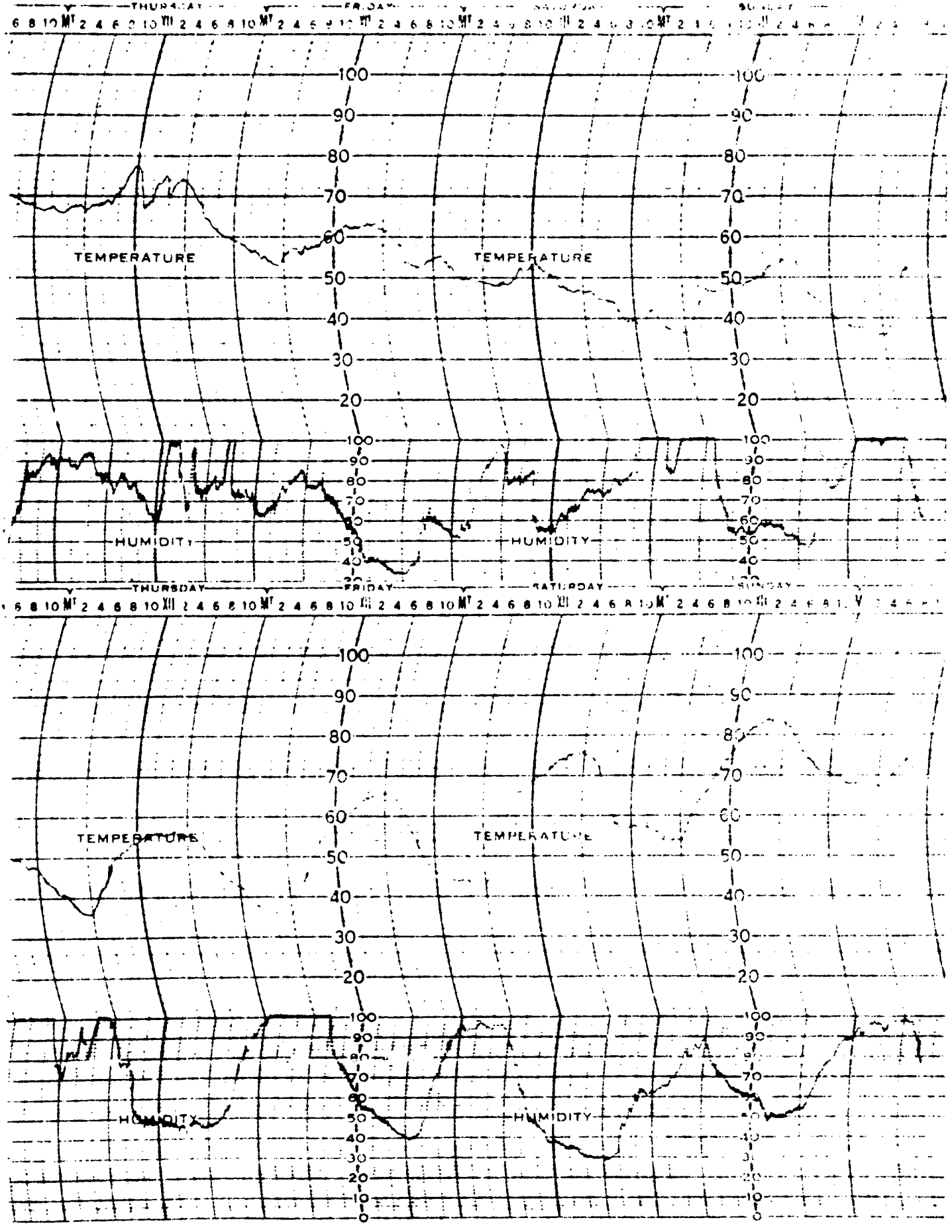

THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY

B

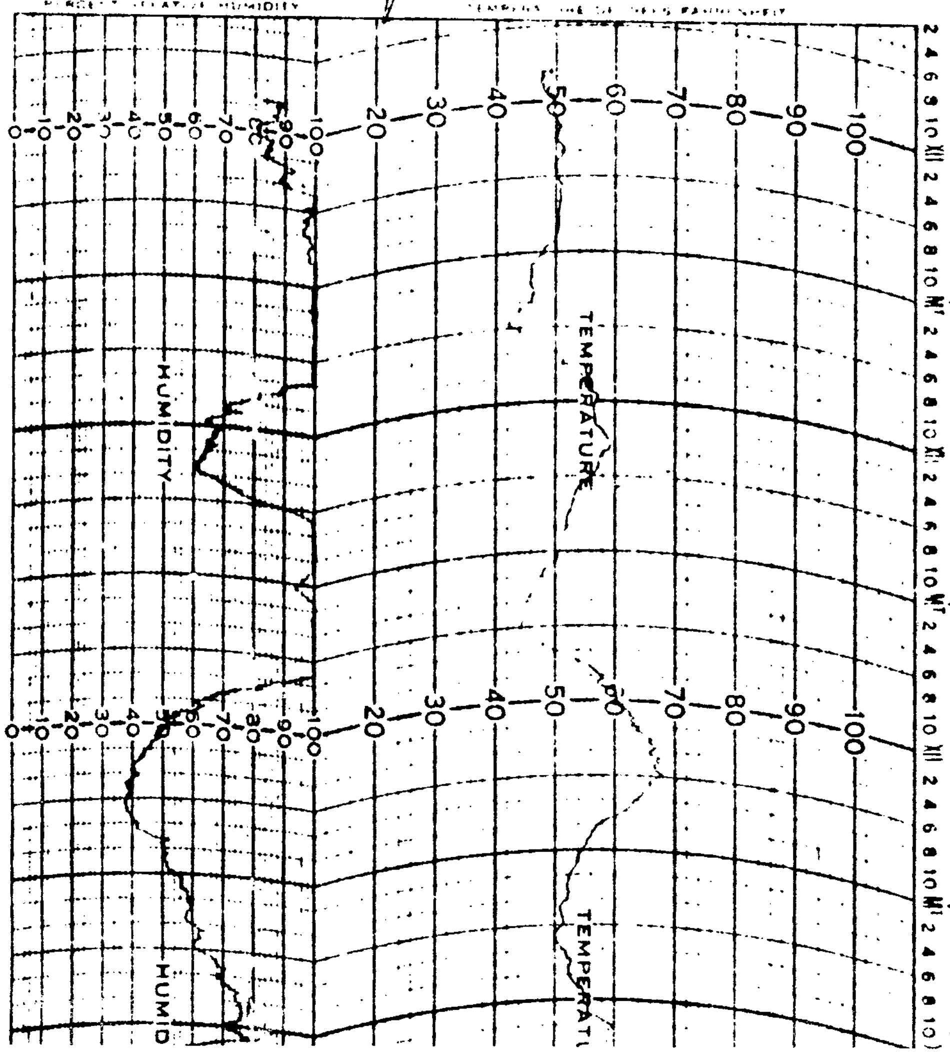
8:50
56%
73°

HYGRO-THERMOGRAPH
CHART NO 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE, MARYLAND U.S.A.

on 7:30
84%
49°

INSTRUMENT NO
DATE June 14, 1965 STATION Sou. Lk. #1



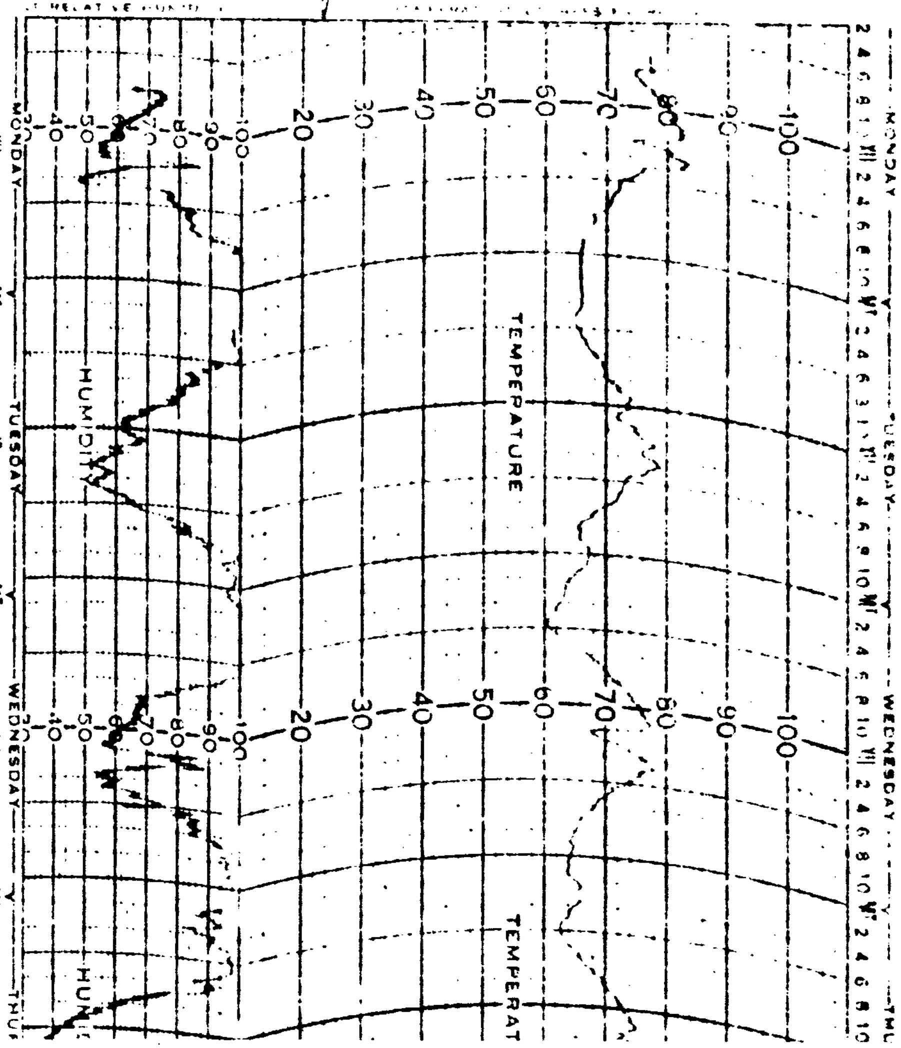
7:30
49°
85%

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

on 7.00
25
50%

INSTRUMENT NO
DATE June 1, 1965 STATION Sou. Lk. #1



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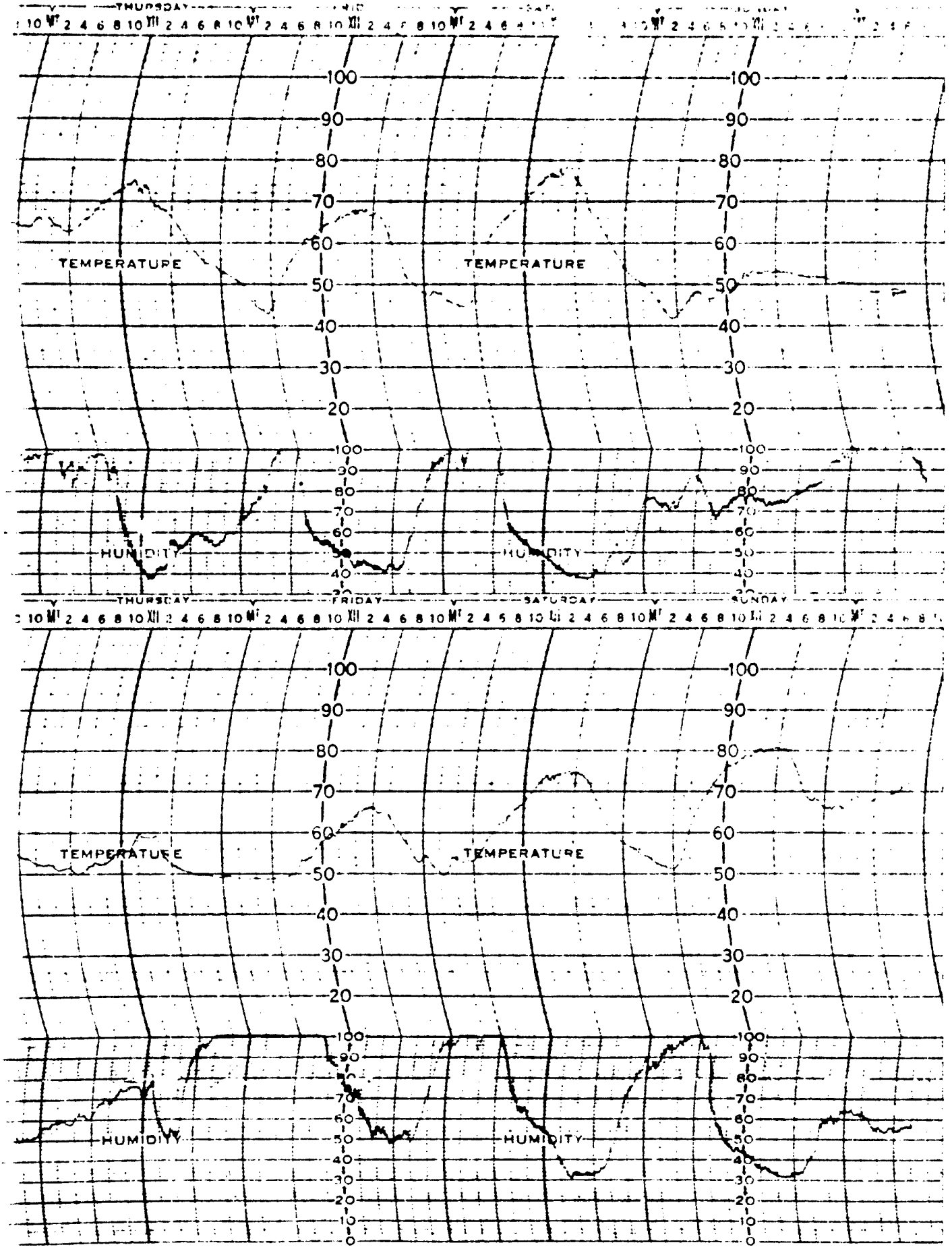
THURSDAY
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FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
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TEMPERATURE
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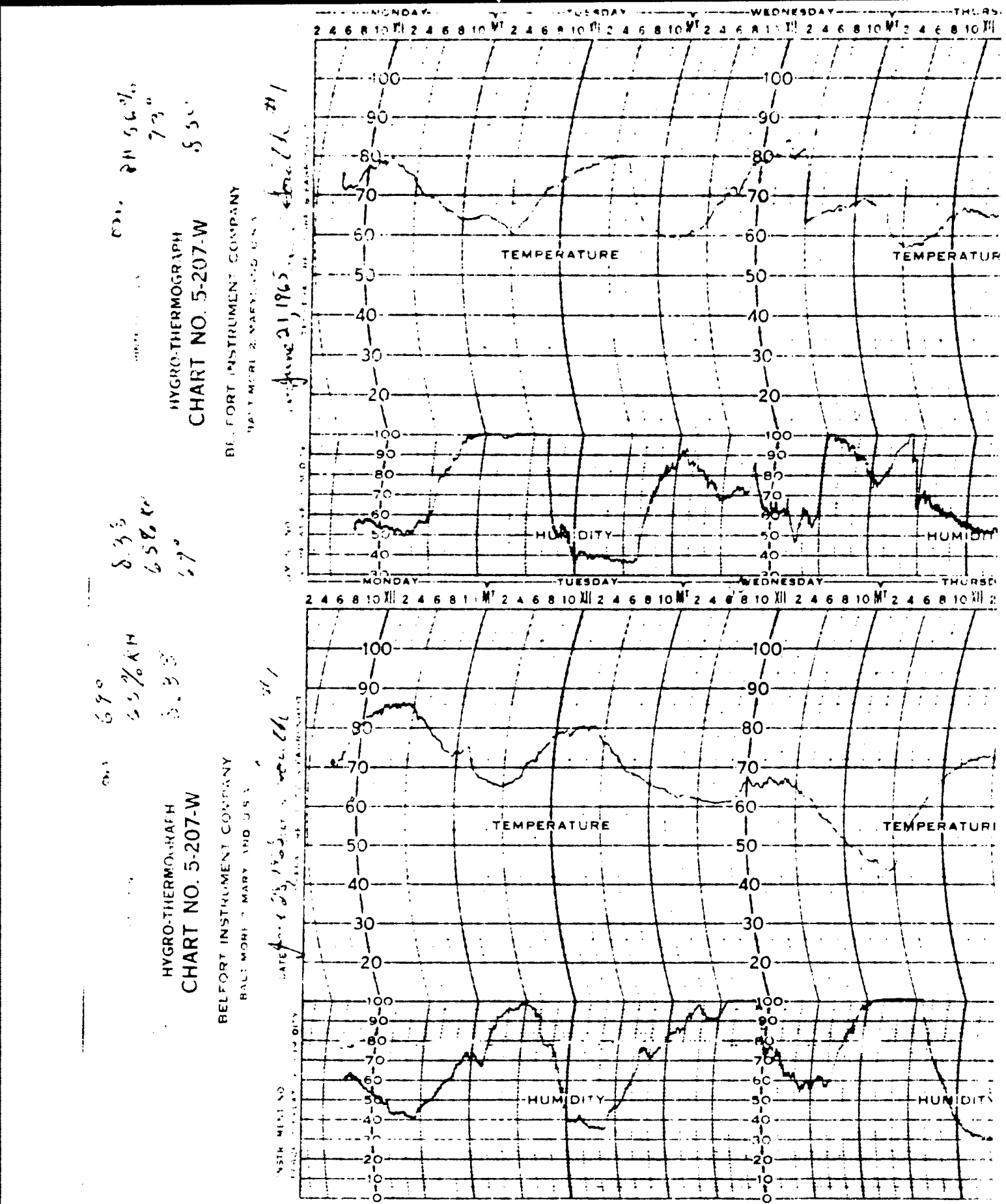
B


HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
MONDAY
TUESDAY
WEDNESDAY
TEMPERATURE
HUMIDITY

HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
MONDAY
TUESDAY
WEDNESDAY
TEMPERATURE
HUMIDITY

A


THURSDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY

B

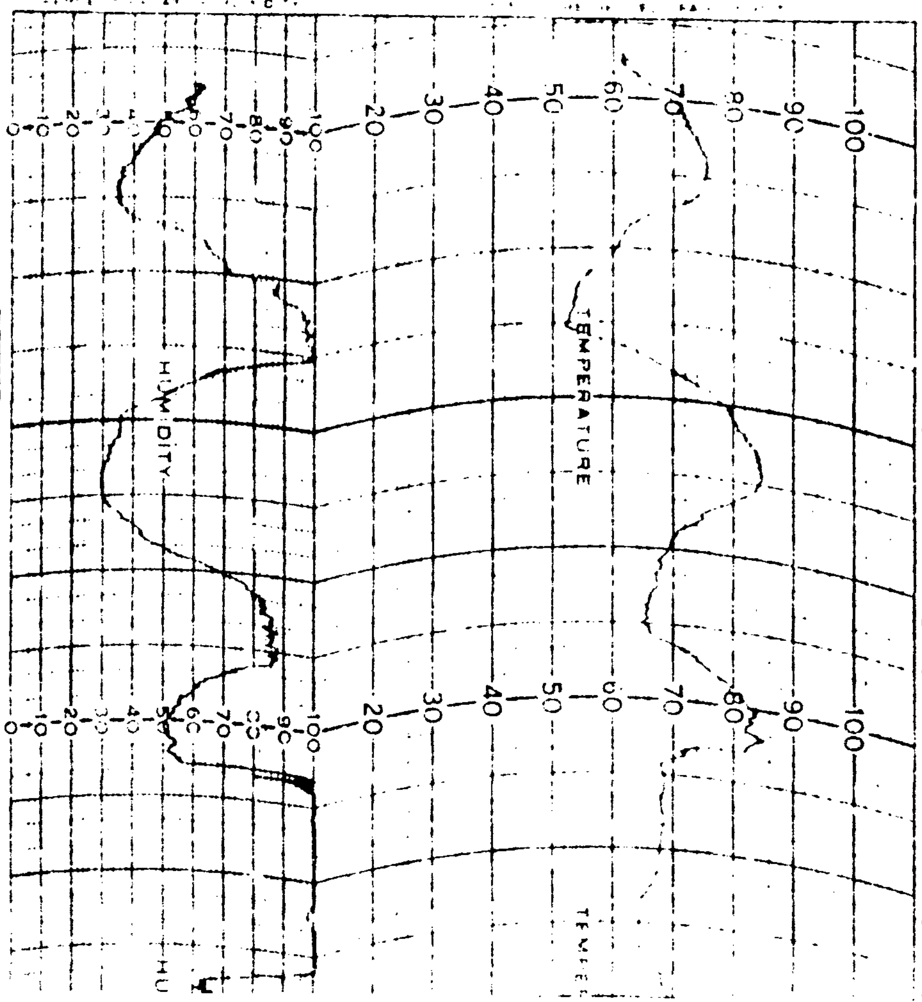
9! 8?%
66°
82%

on 61% 21%
61° 1°
84% 10

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY

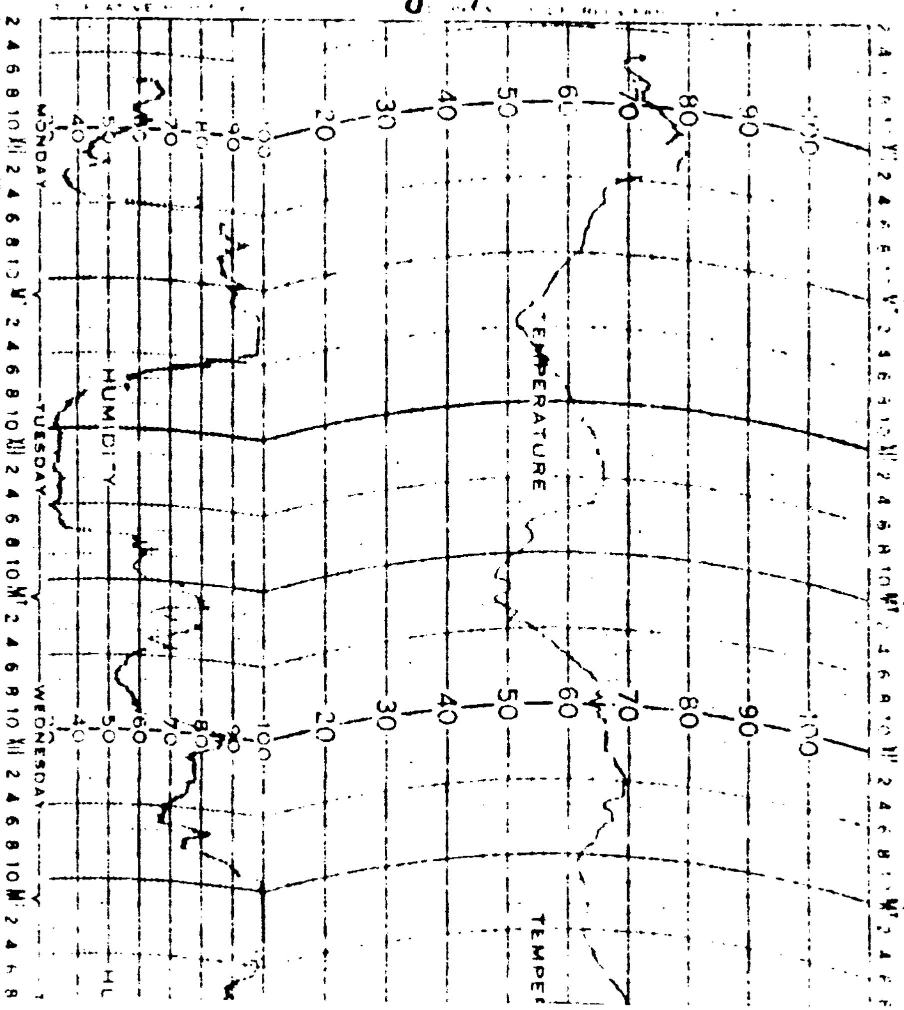
7/12/65 South #1



HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY

July 5, 1965 South #1



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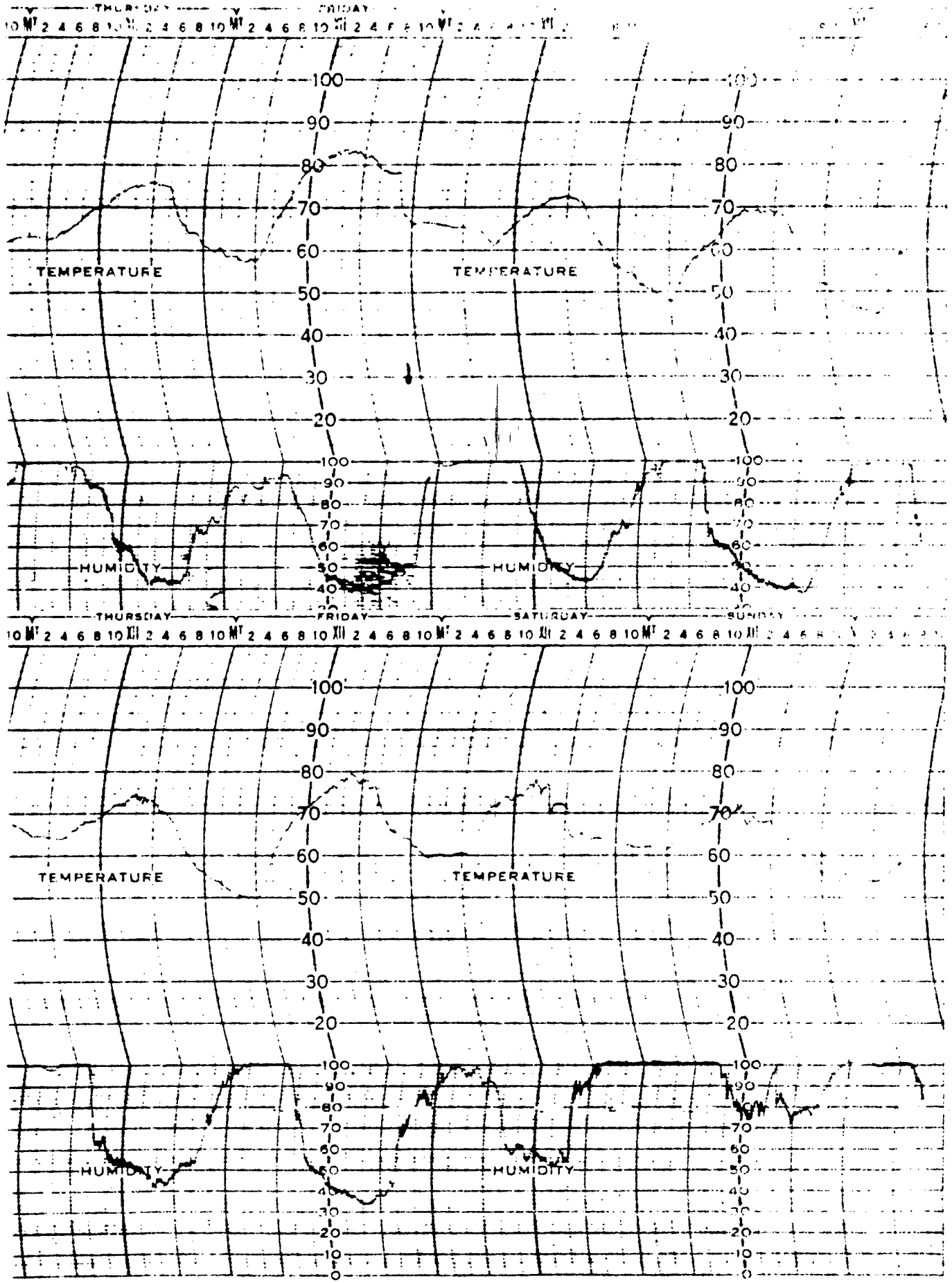

THURSDAY
FRIDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY

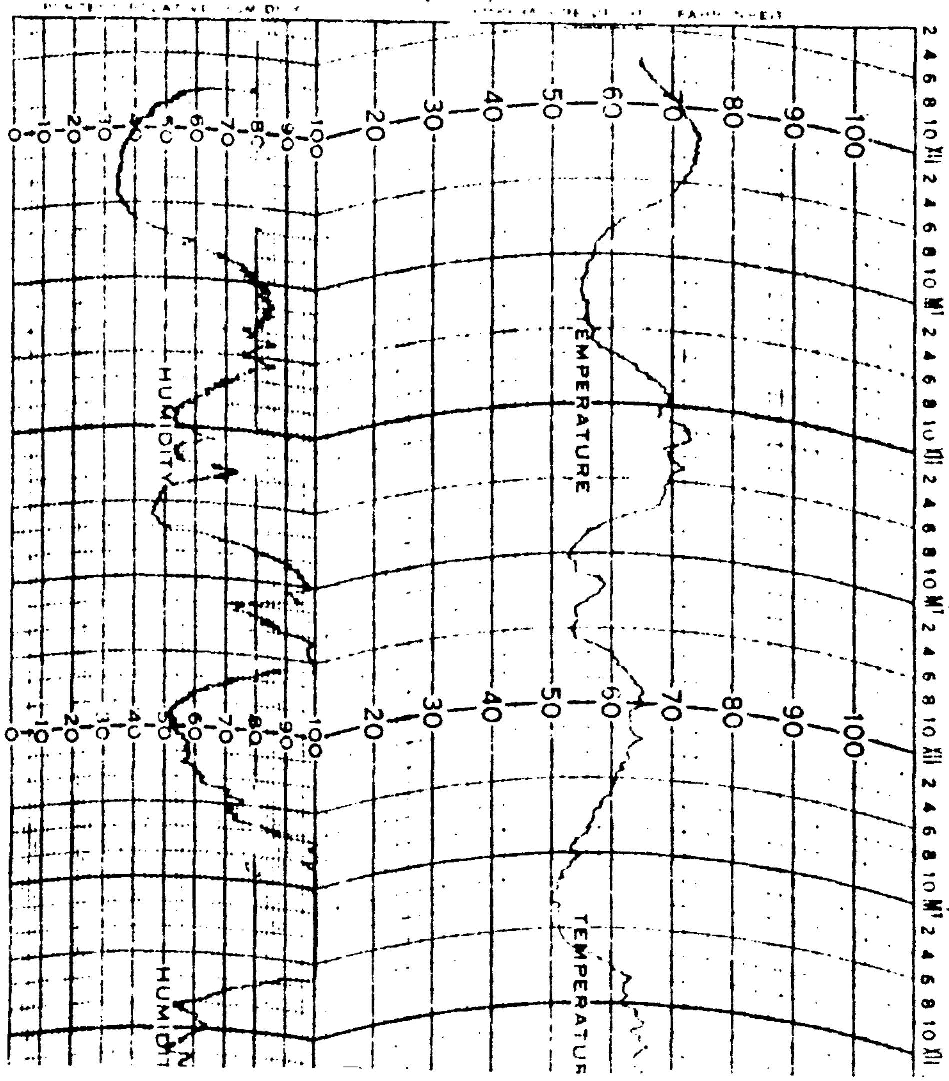
61°
100%
8.05

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2, MARYLAND U.S.A.

DATE 7/26/65 South #1

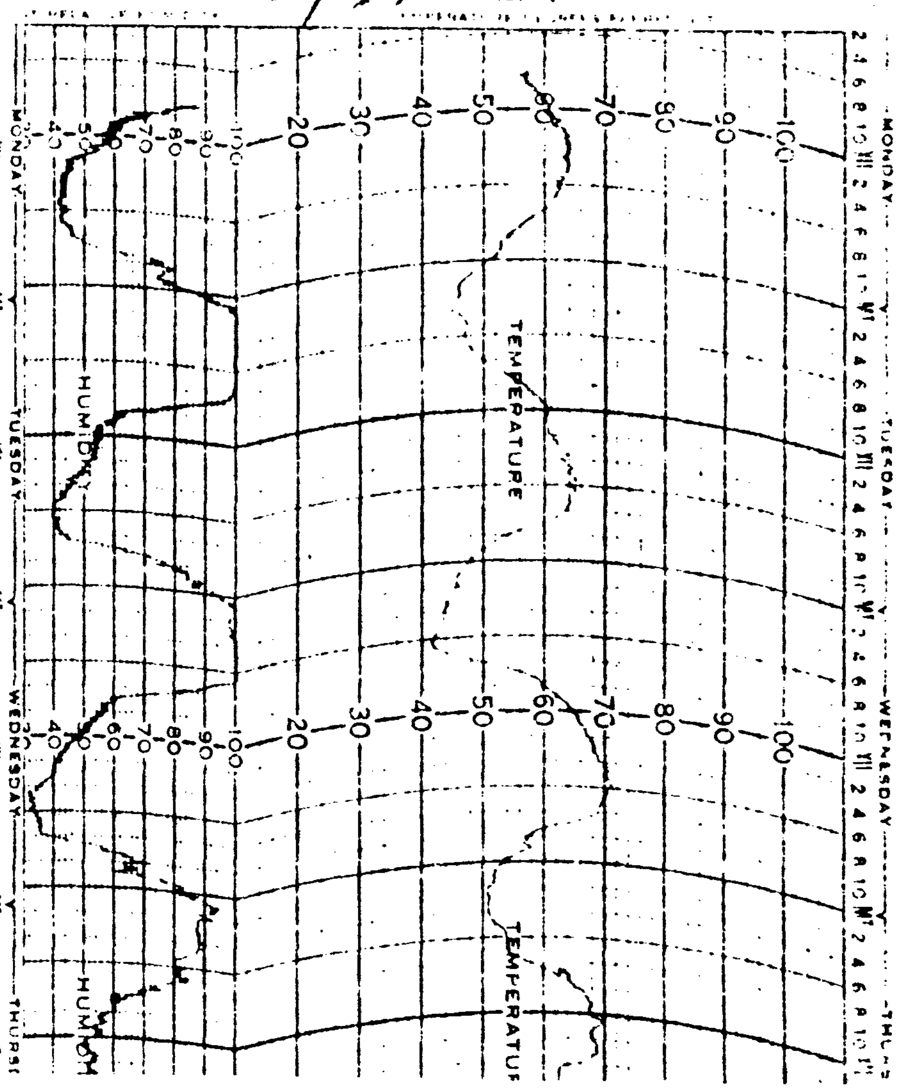
on: 80% 30%
8:33 65°
65° 8:33



HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2, MARYLAND U.S.A.

DATE July 19, 1965 South #1



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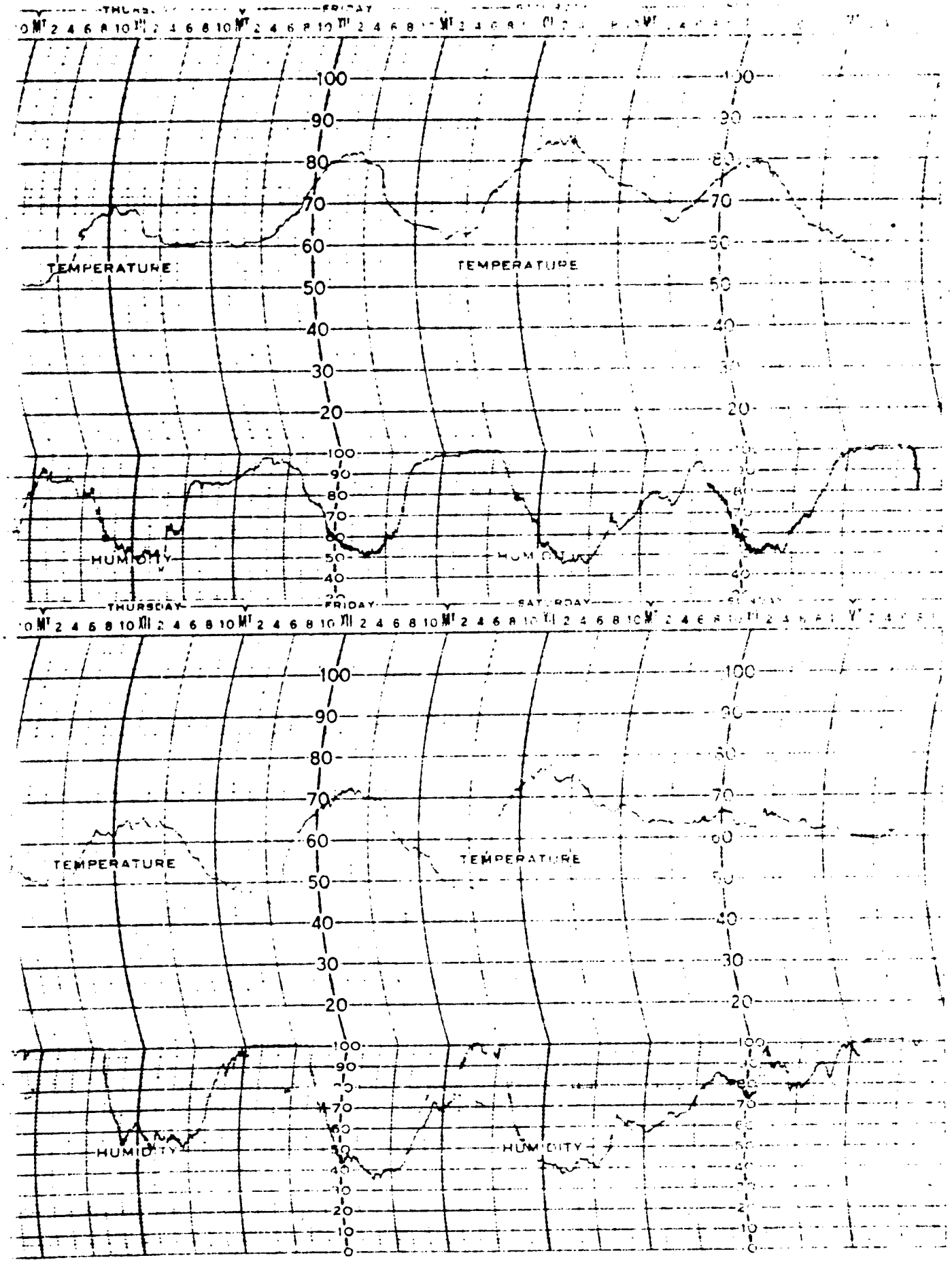
THURSDAY
FRIDAY
SATURDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY

off. 73°
840
80%

on: 72°
88%
9.00

.00
18%
2°

8:0
100%
61°

HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

DATE Aug 9, 1965 South #1

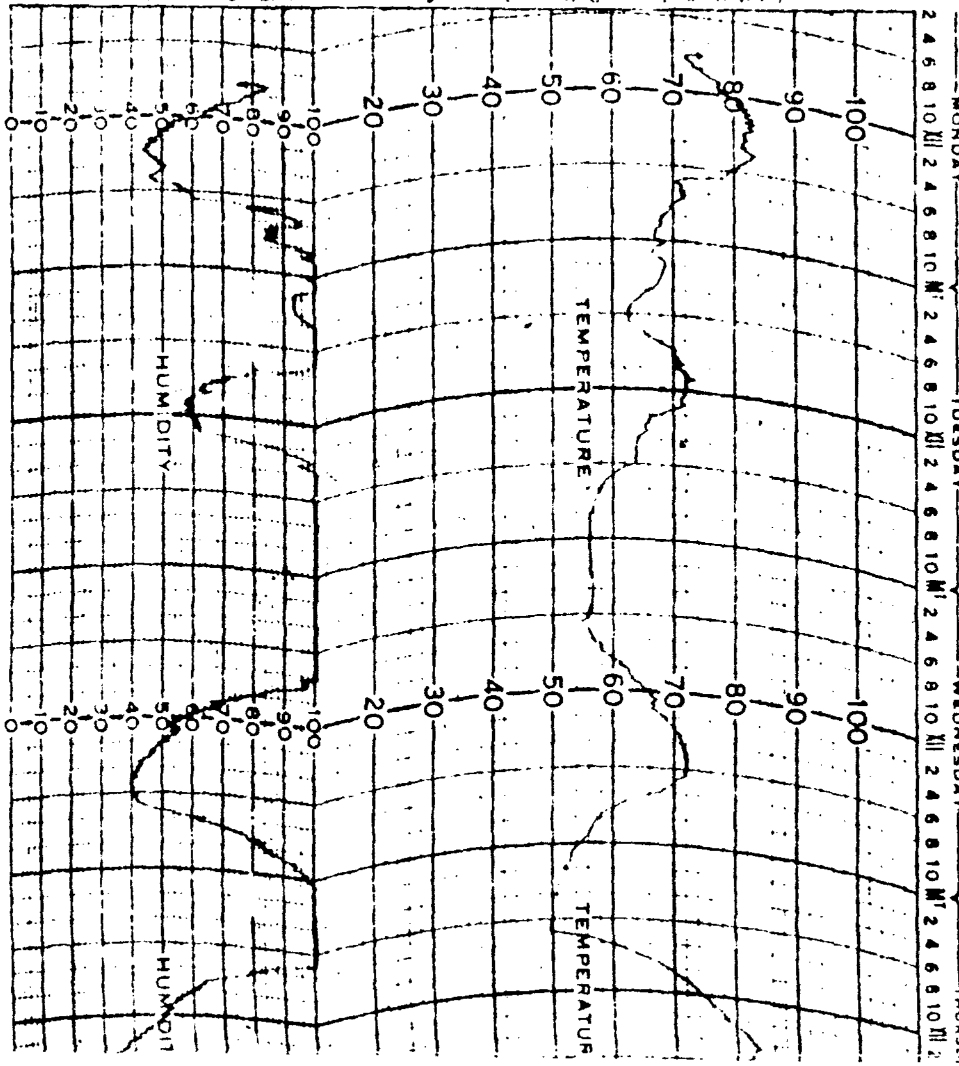

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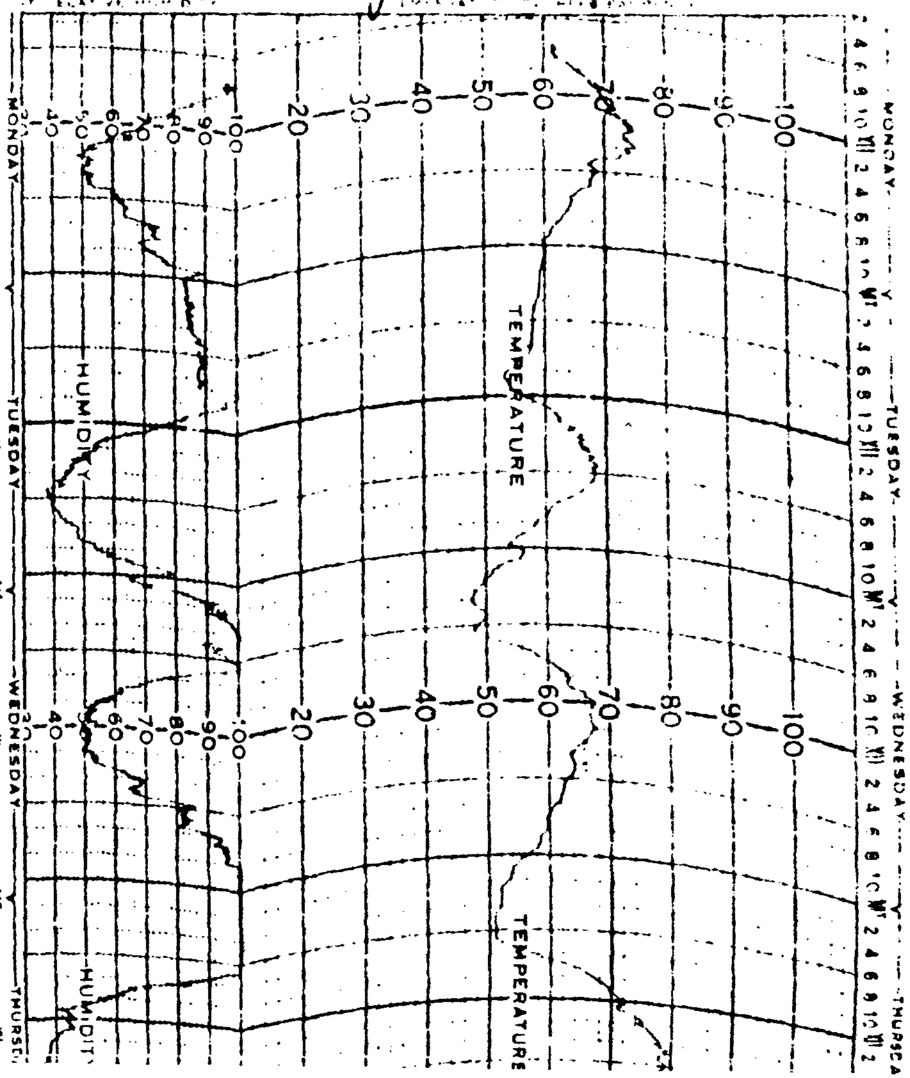
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

DATE Aug 2 1965 South #1



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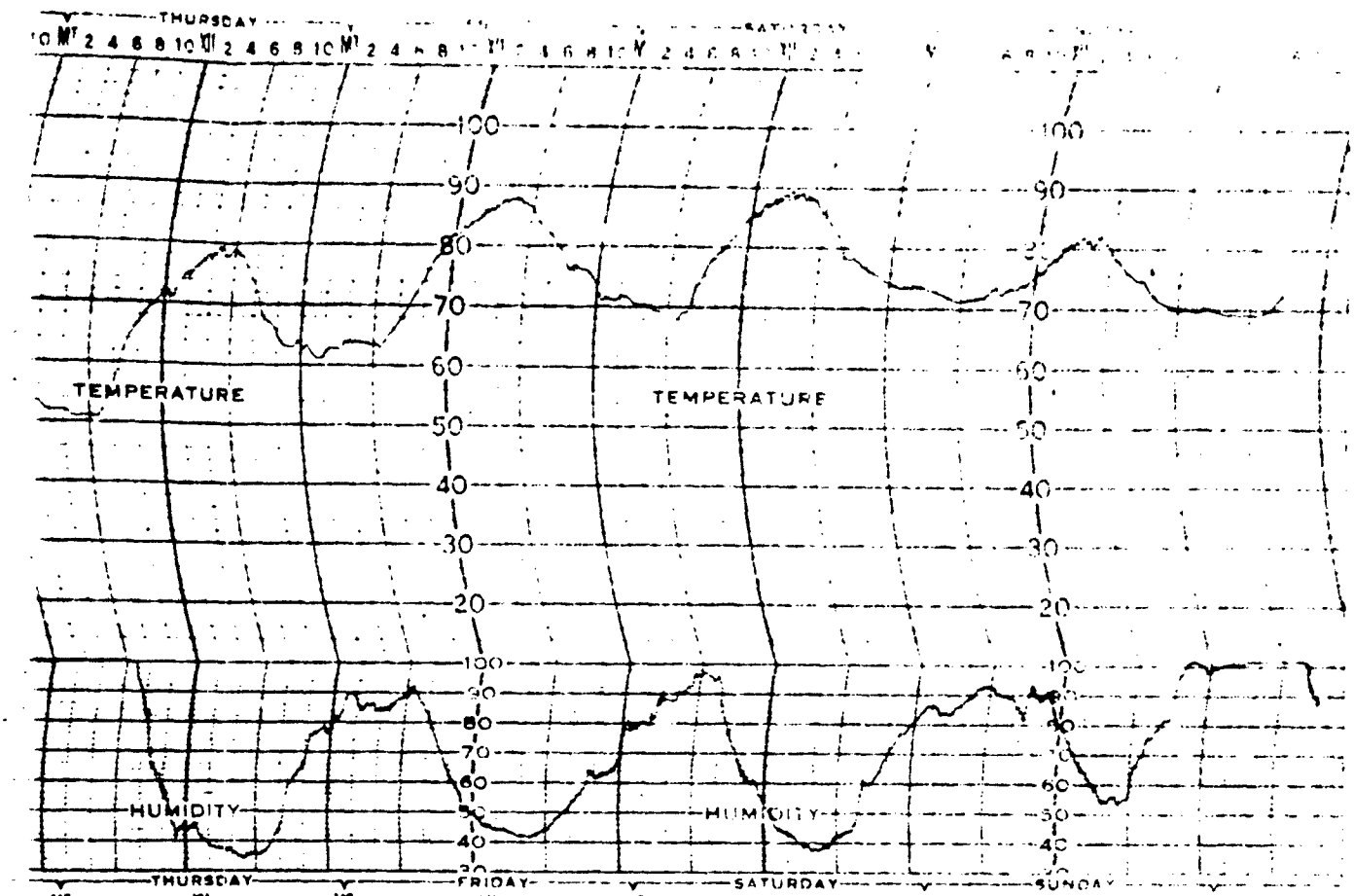
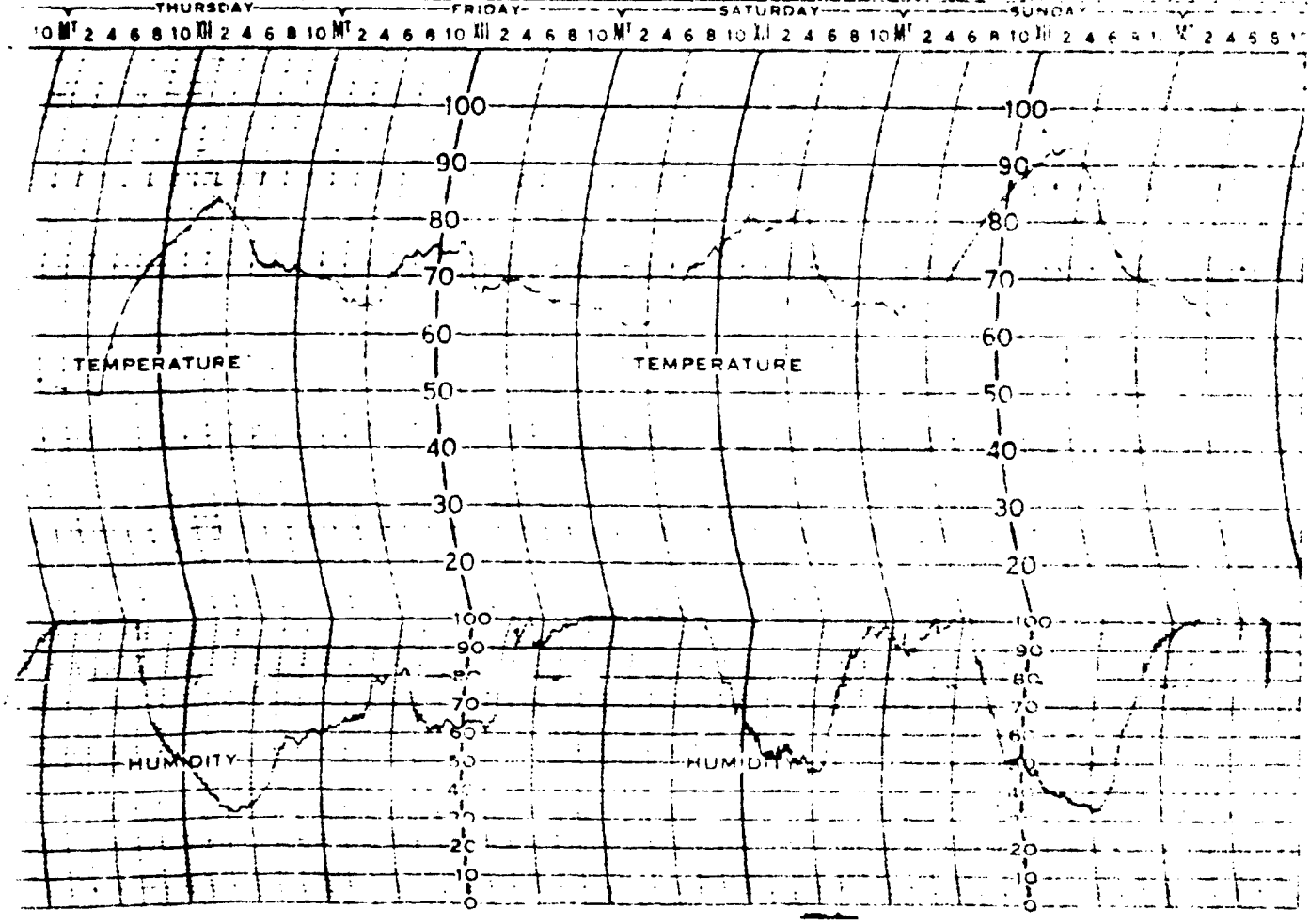

THURSDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY


THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
HUMIDITY
TEMPERATURE
HUMIDITY

B

A

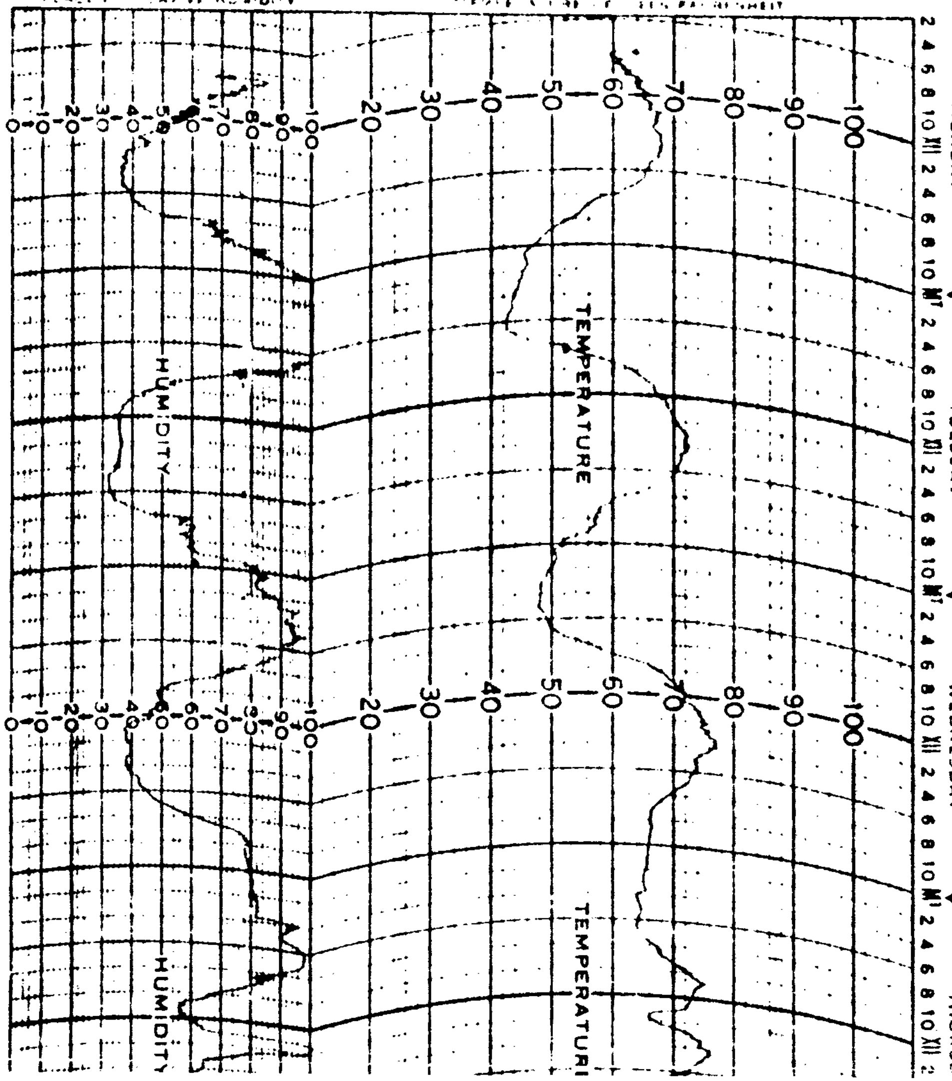
HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

on: 8:35 — 60° — 90%

35 — 0° — 0%

DATE 8/23/65 STATION South #1

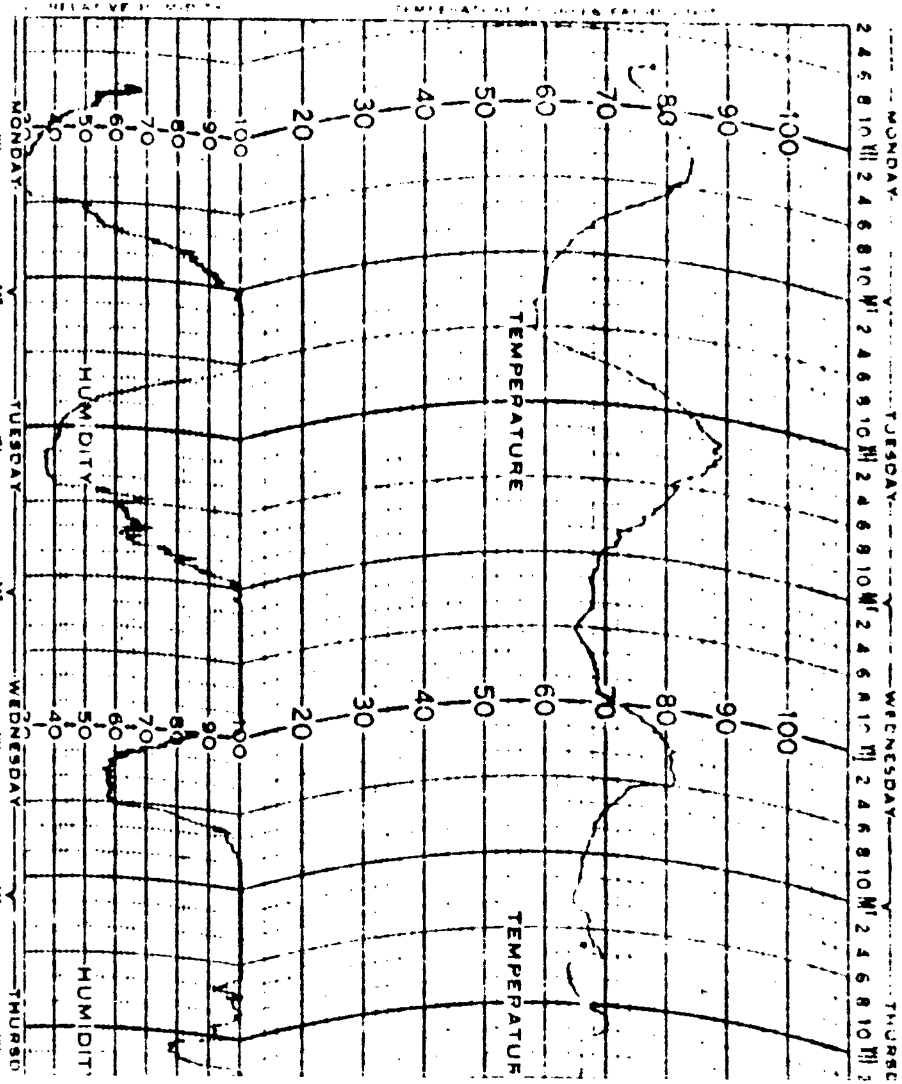


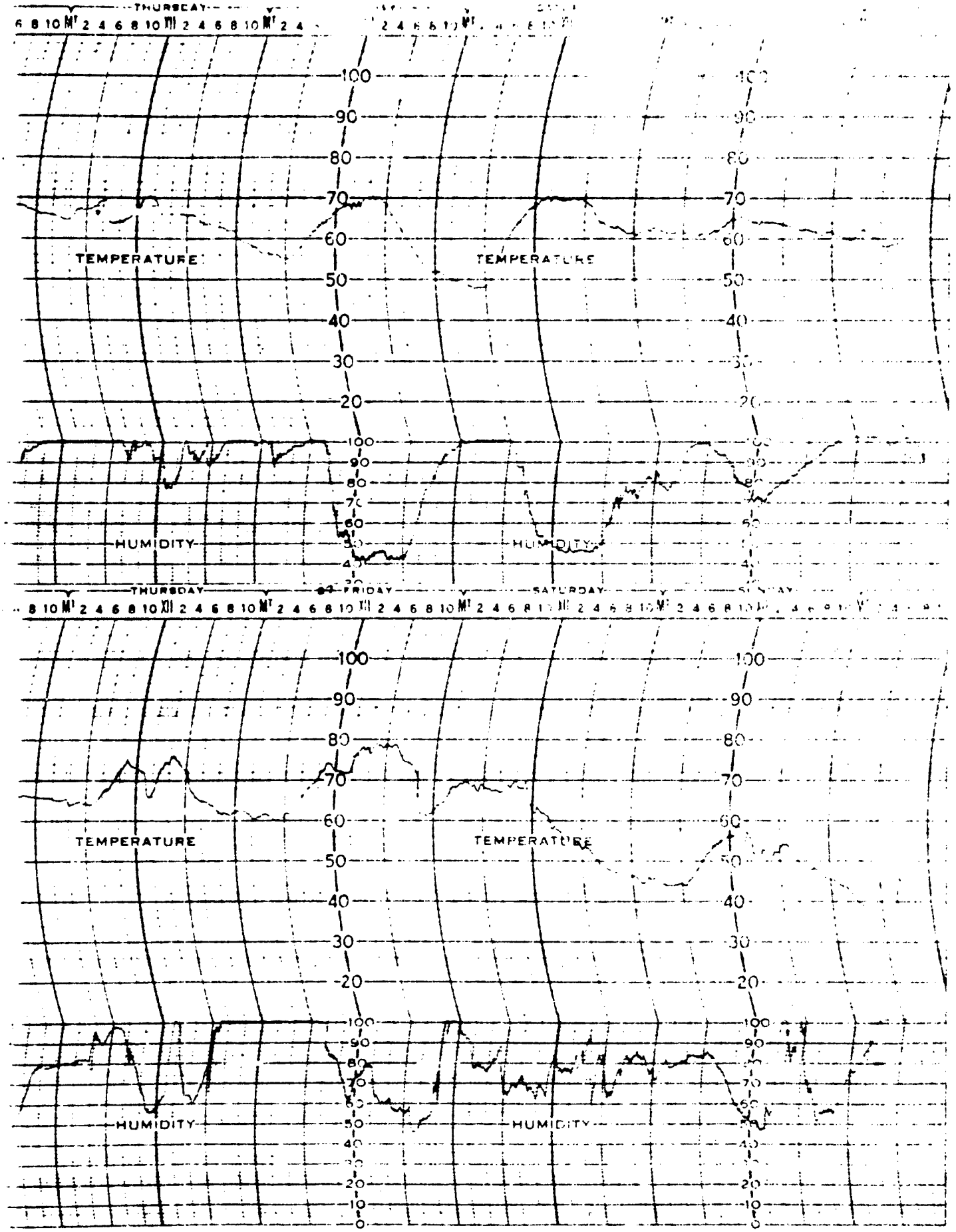
HYGRO THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

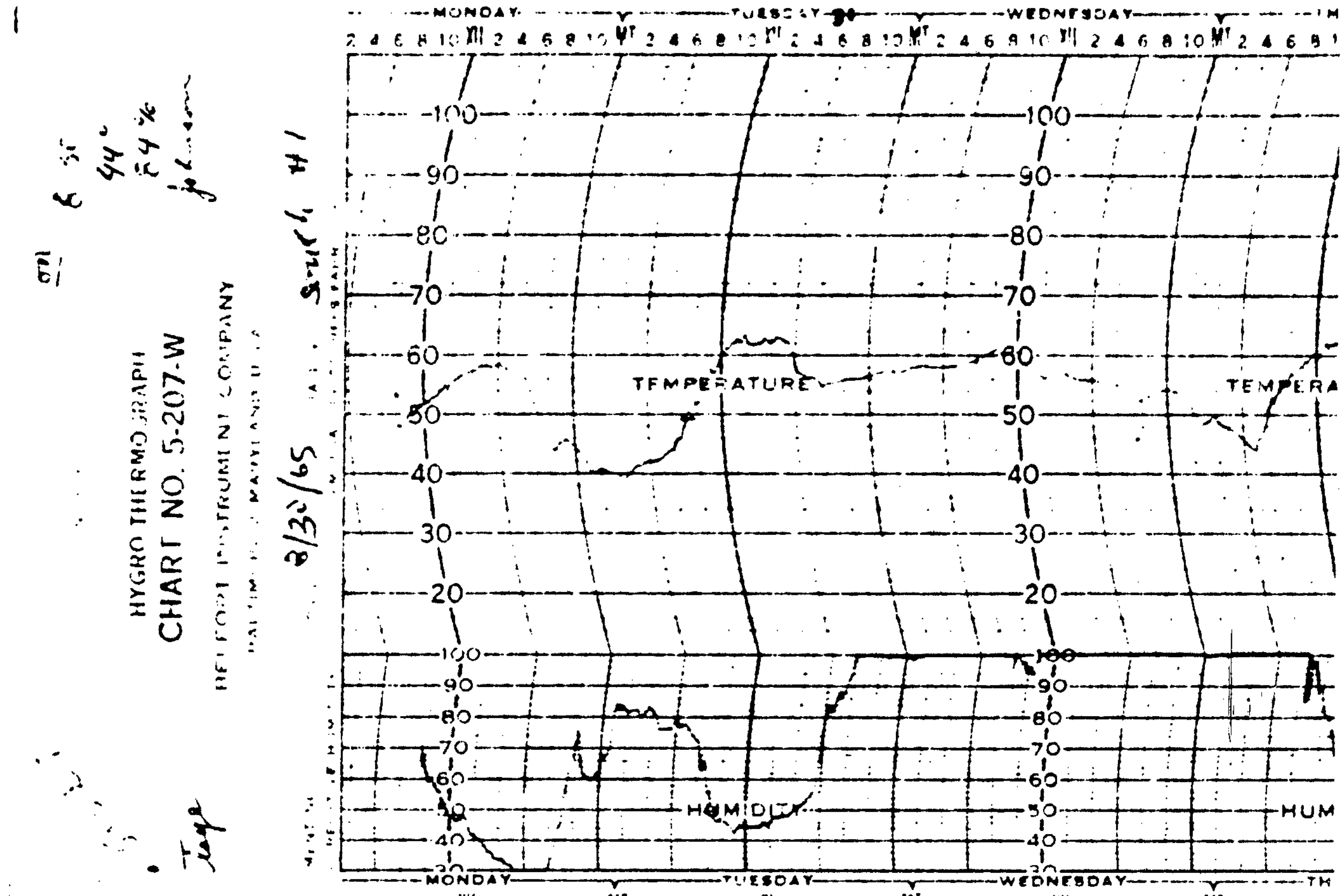
on: 8:40 — 80% — 73°

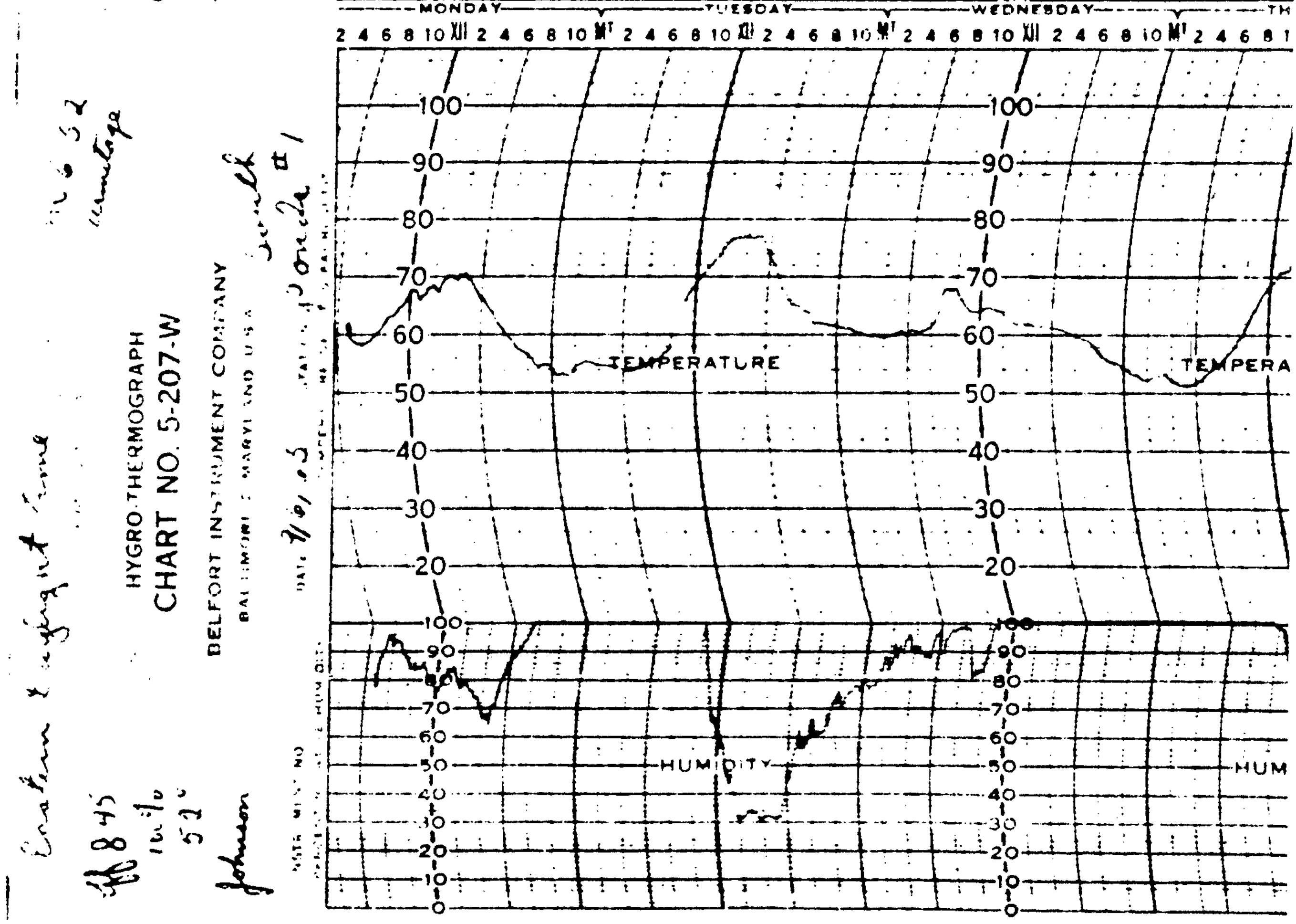
DATE [illegible] STATION [illegible]



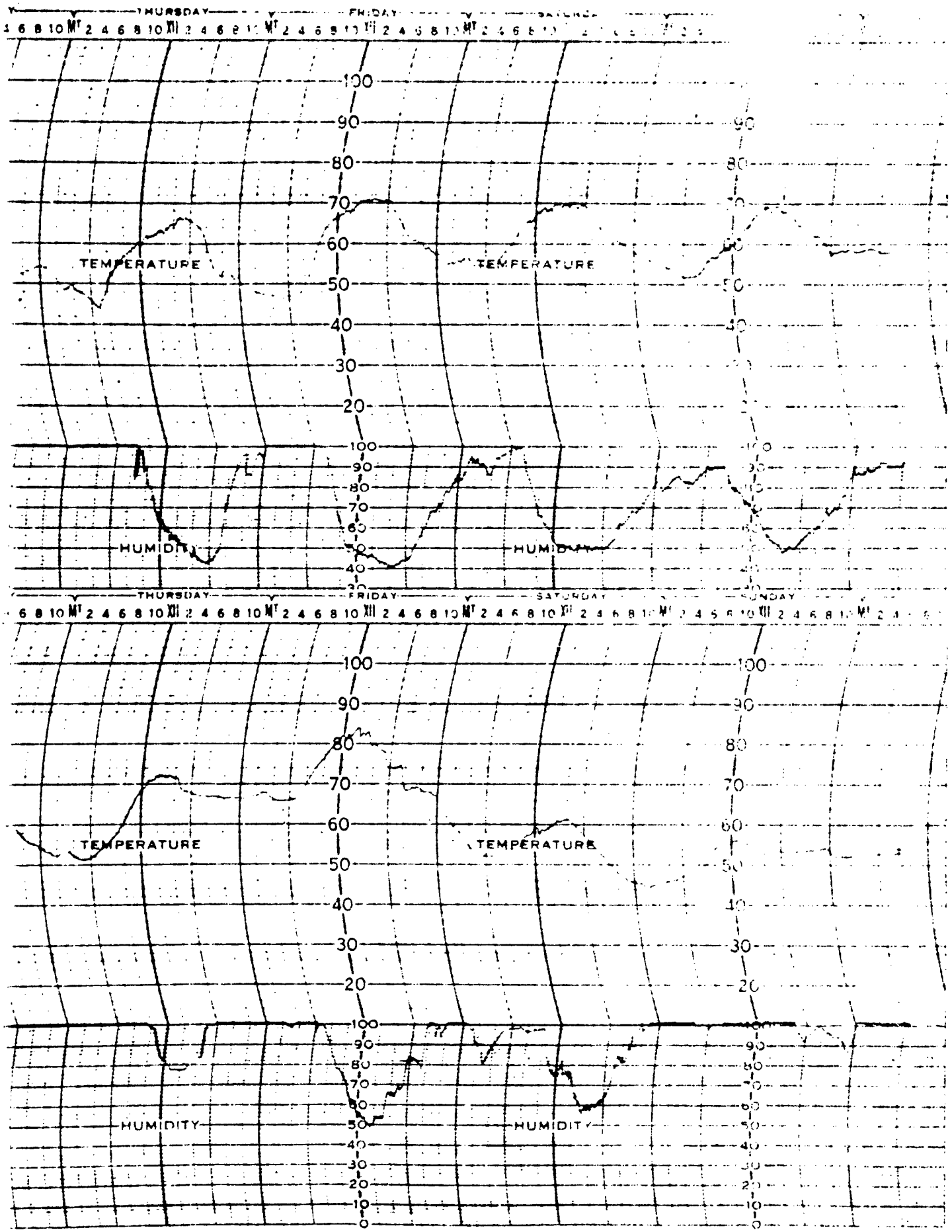

THURSDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY

B


HYGRO THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
MONDAY
TUESDAY
WEDNESDAY
TEMPERATURE
HUMIDITY
8/30/65


HYGROTHERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
MONDAY
TUESDAY
WEDNESDAY
TEMPERATURE
HUMIDITY
Johnson

A


THURSDAY
FRIDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY

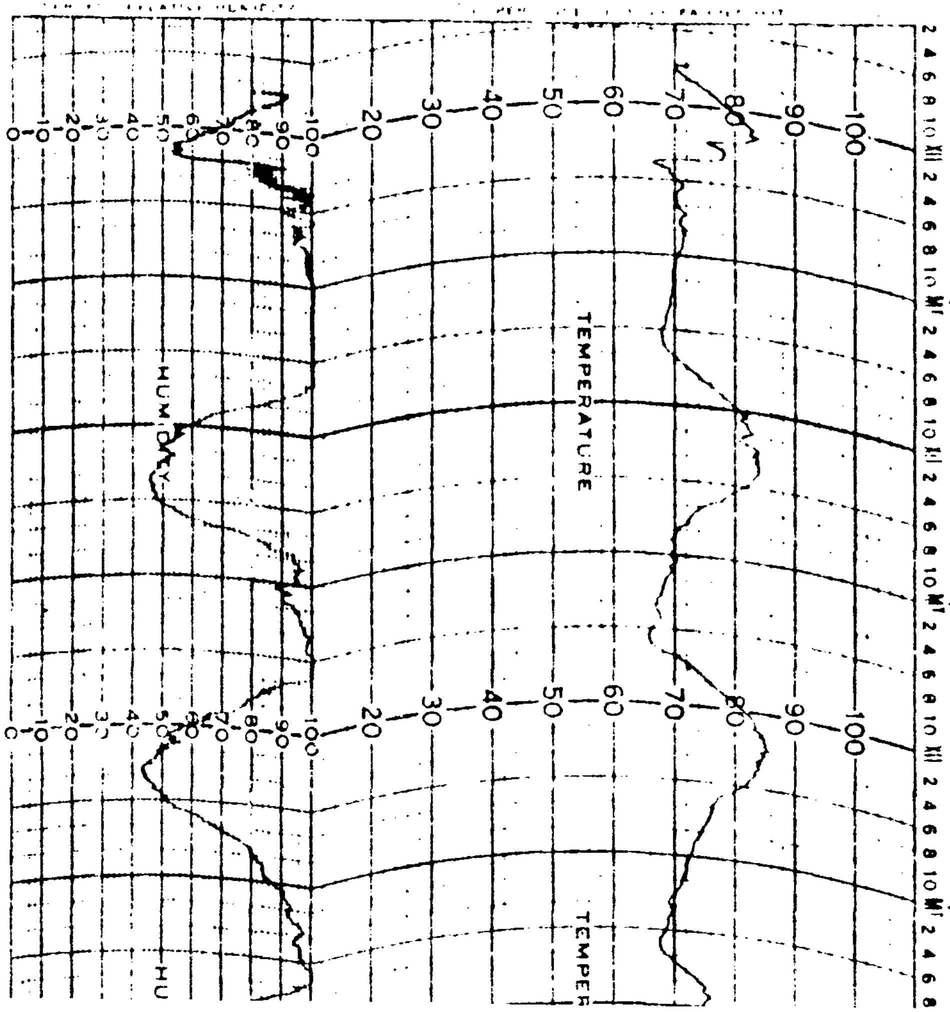
off 3:55
62%
36°F

on 71°
94%
8:35

HYGRO THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

DATE 9/20/63 · South #1

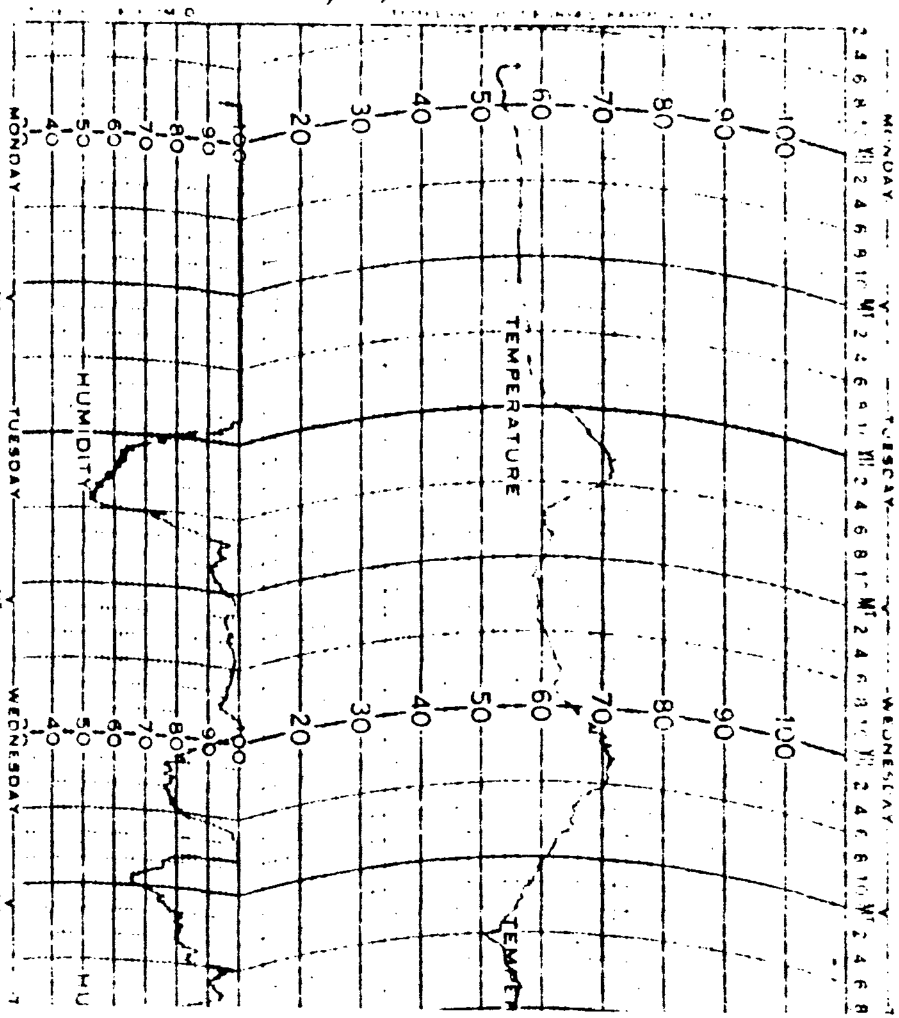


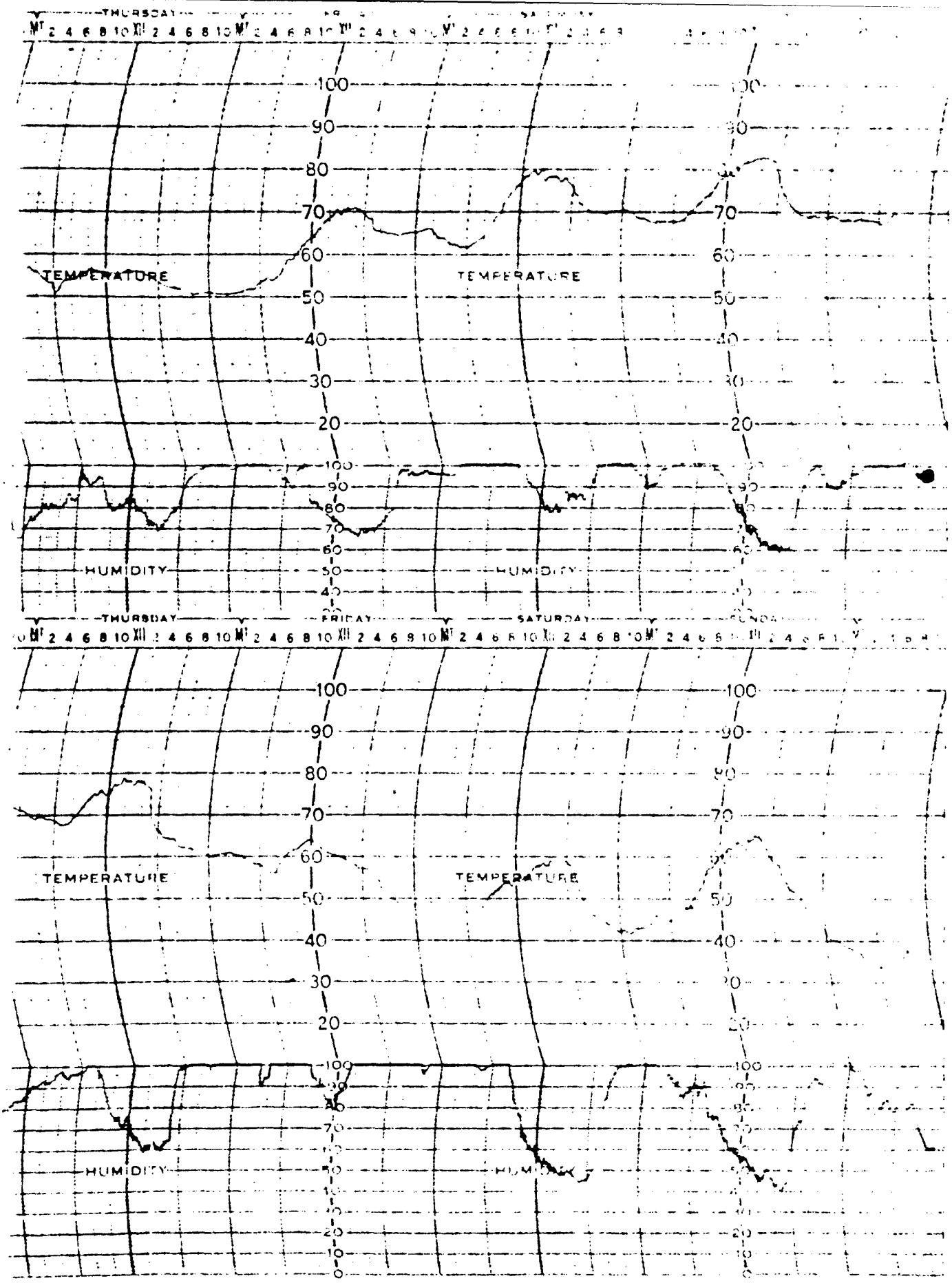
94%
71°
8:35

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

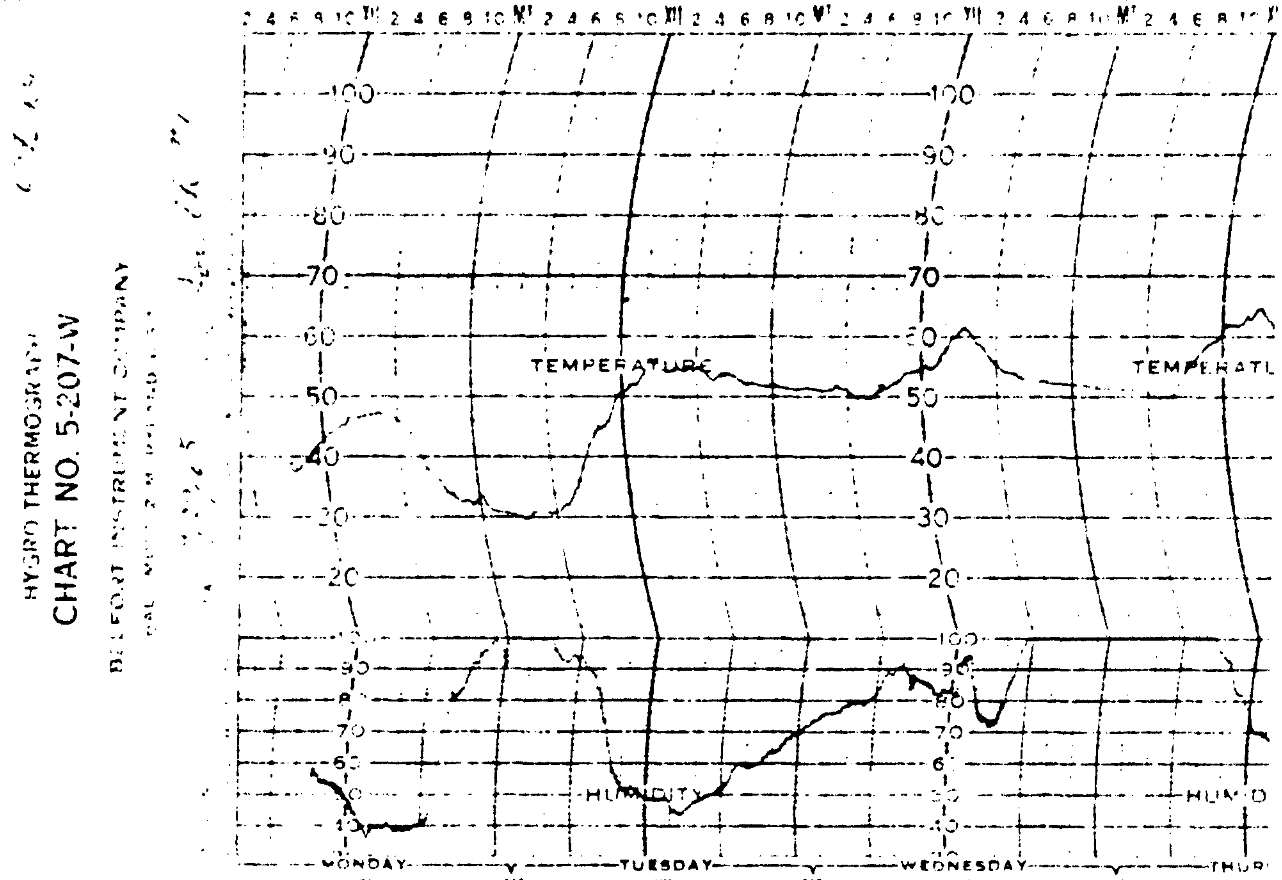
BELFORT INSTRUMENT COMPANY
BALTIMORE 2 MARYLAND U.S.A.

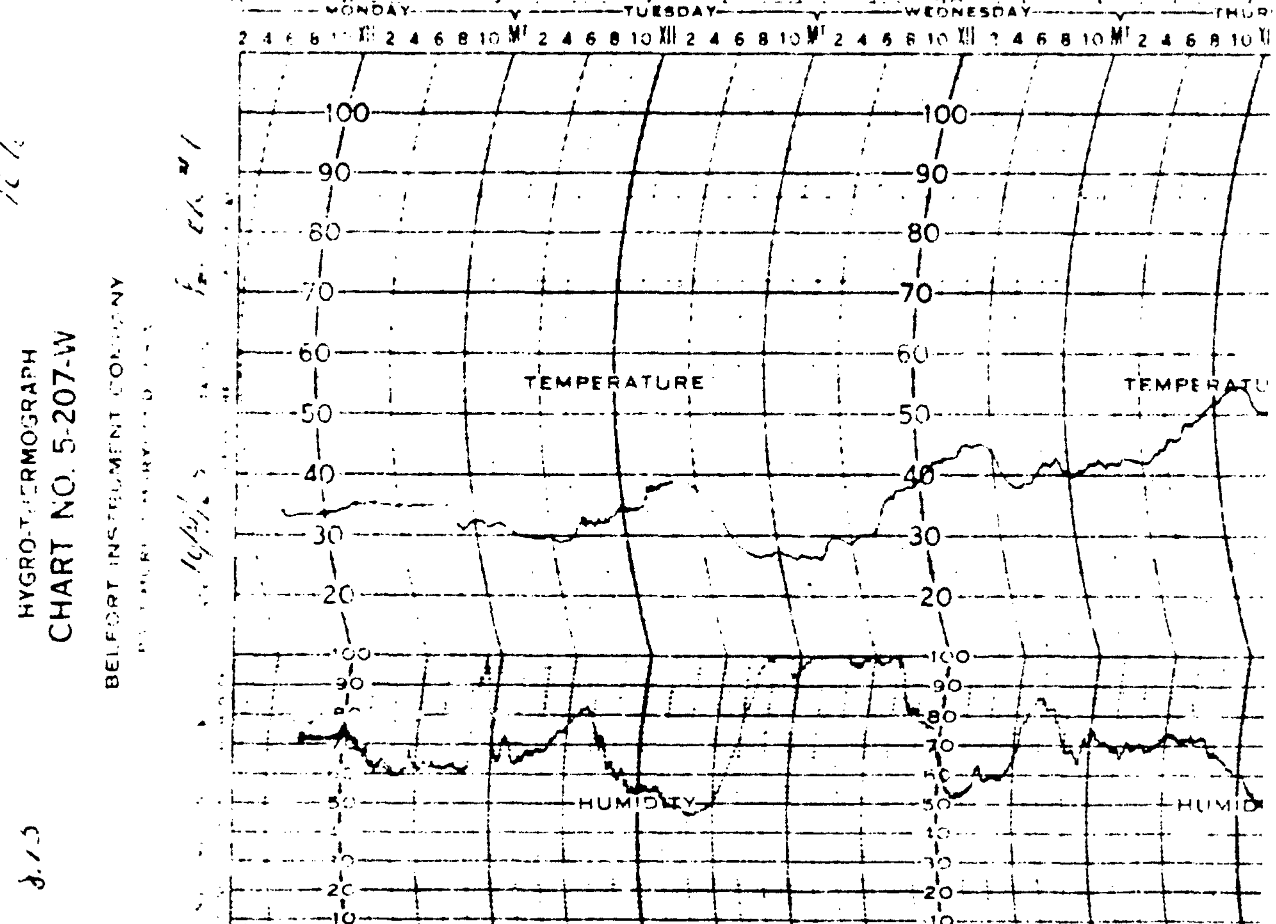
DATE 7/3/63 · South #1




THURSDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
TEMPERATURE
TEMPERATURE
HUMIDITY

B

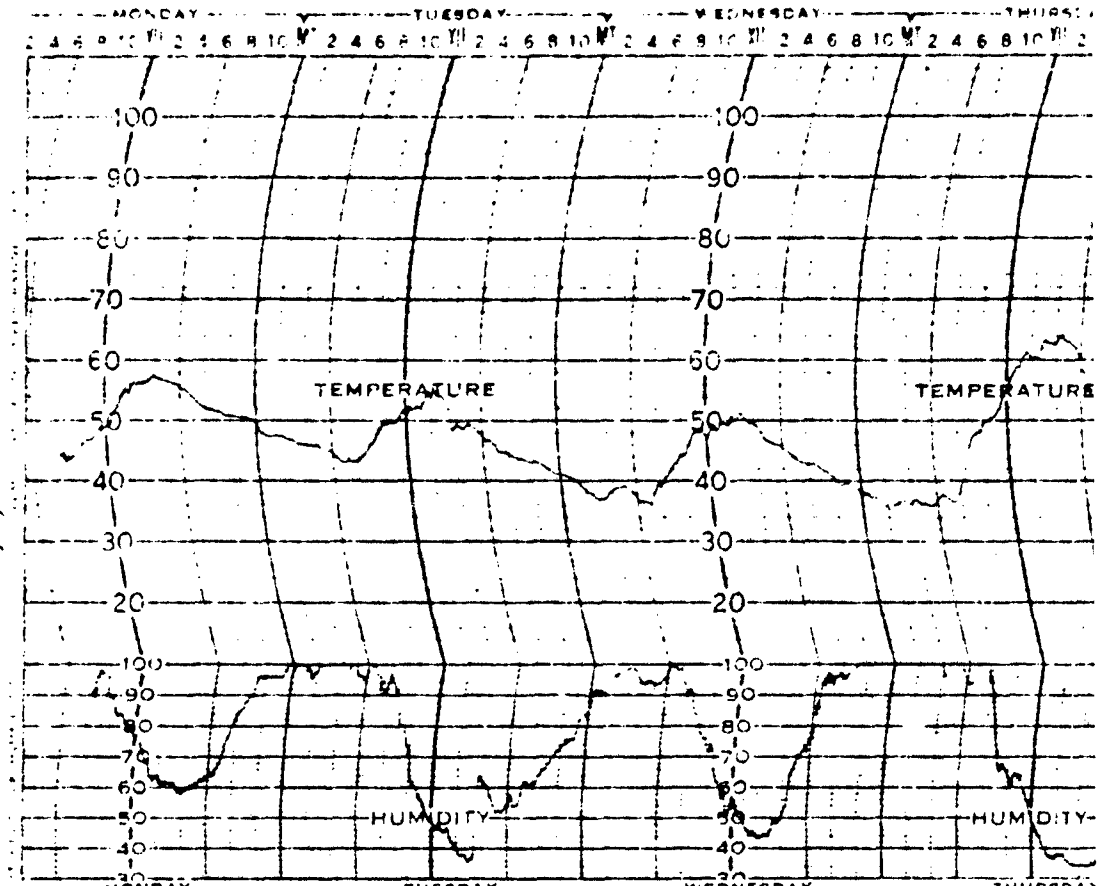

HYGRO THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
TEMPERATURE
HUMIDITY
MONDAY
TUESDAY
WEDNESDAY


HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY
TEMPERATURE
HUMIDITY

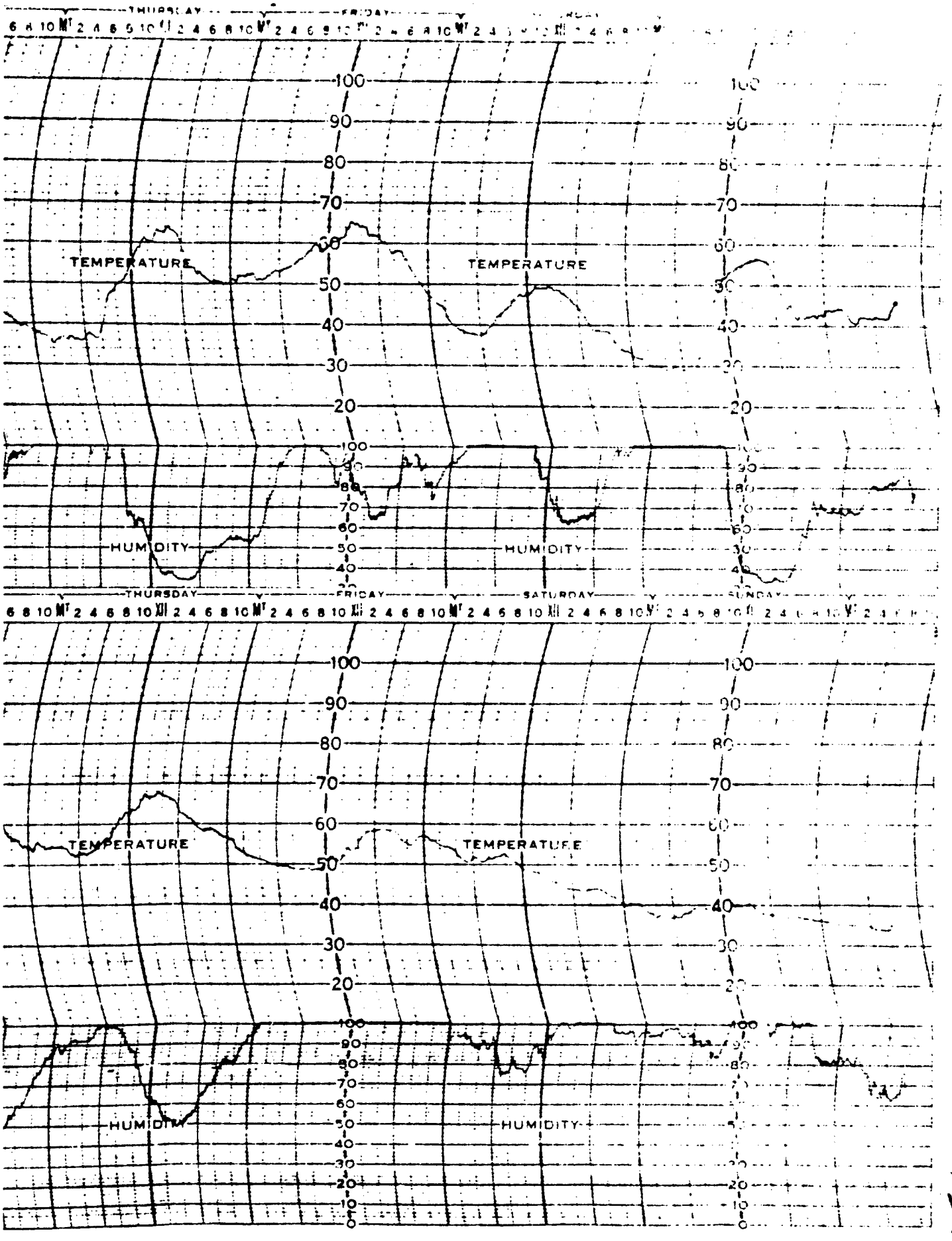
A


THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY

HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY



HYGRO-THERMOGRAPH
CHART NO. 5-207-W
BELFORT INSTRUMENT COMPANY


THURSDAY
FRIDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY
THURSDAY
FRIDAY
SATURDAY
TEMPERATURE
TEMPERATURE
HUMIDITY
HUMIDITY

B

off 8:30 E.S.T.
9:30 E.D.T.

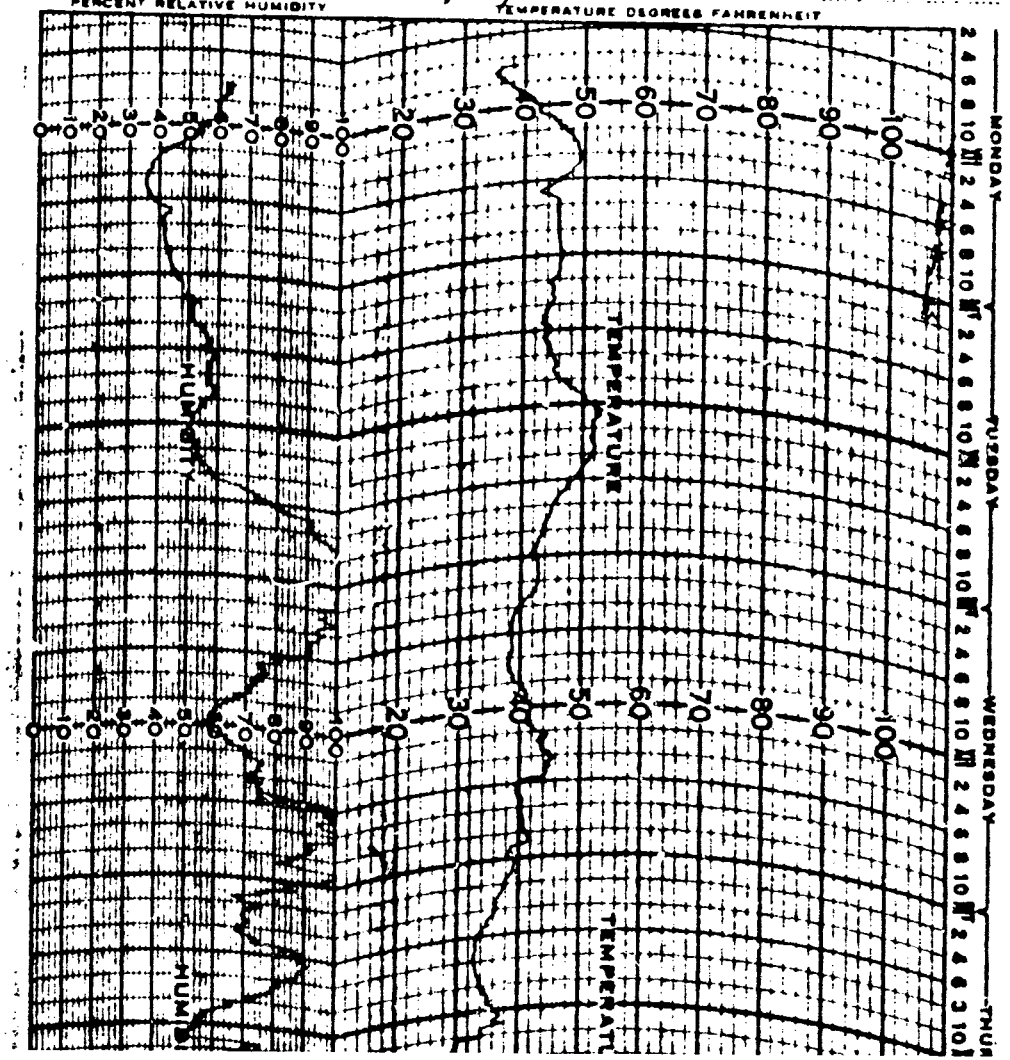
on 8:40 E.S.T.
70%
34°F

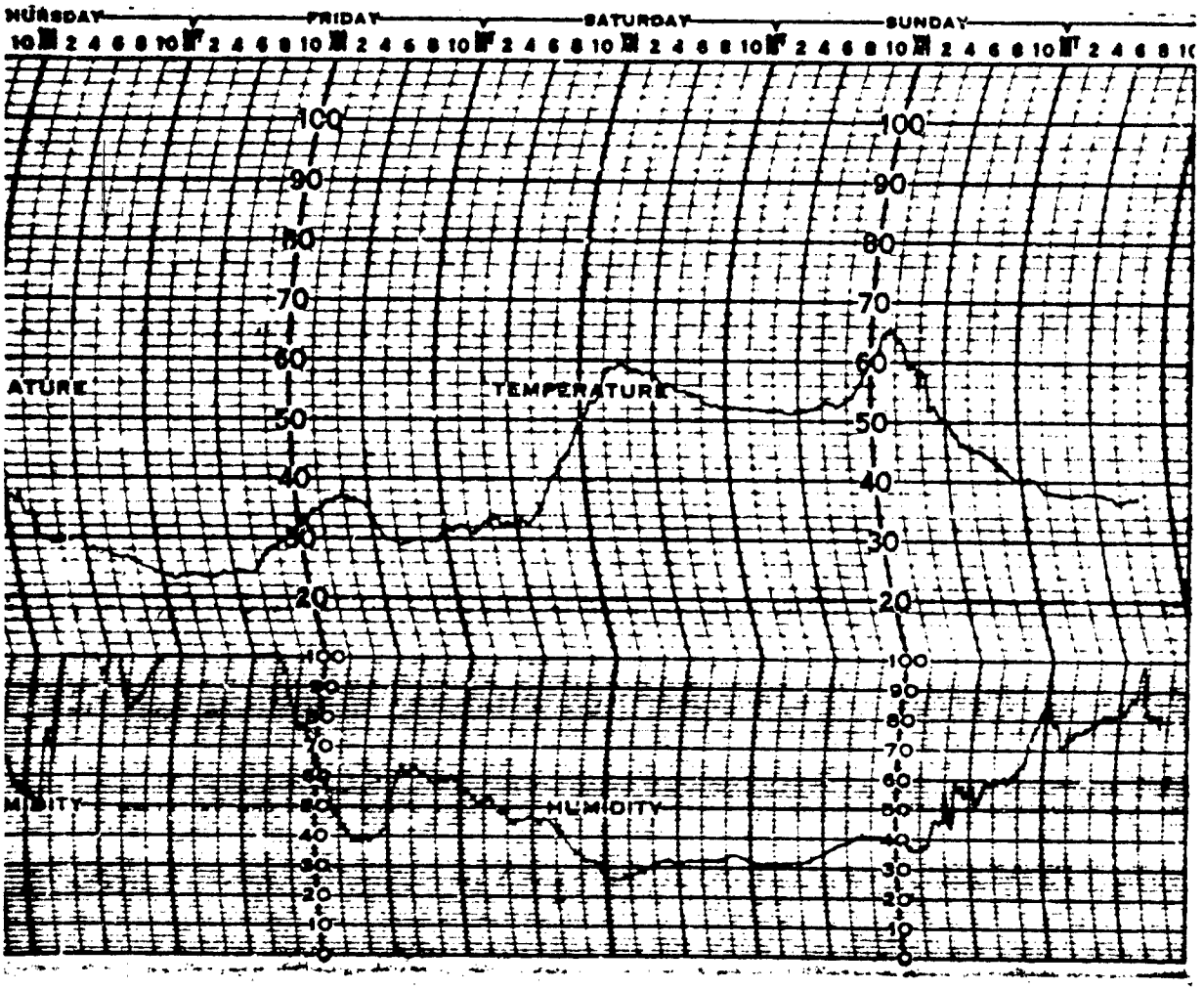
PRINTED IN U.S.A.

HYGRO-THERMOGRAPH
CHART NO. 5-207-W

BELFORT INSTRUMENT COMPANY
BALTIMORE 2, MARYLAND, U.S.A.

INSTRUMENT NO. ..... DATE 10/25/65 STATION South #1




THURSDAY
FRIDAY
SATURDAY
SUNDAY
TEMPERATURE
HUMIDITY