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State of Washington
Department of Ecology

Memo to: Jim Knudson

From: Ron Devitt

Subject: Permit Compliance - Weyerhaeuser, Kraft, Everett

OBJECTIVE

To determine if Weyerhaeuser (Weyco.) kraft mill at Everett is meeting the conditions of their wastewater discharge permit - namely, 85% BOD (Biochemical Oxygen Demand) reduction and a discharge of .3 lbs SCS/1000 gallons (Suspended Combustible Solids - Whatman 40).

INTRODUCTION

In an attempt to evaluate the efficiency of Weyerhaeuser's oxidation lagoons at Everett, a survey was initiated on February 20, 1973. The theoretical retention time of the system is seven days; discharge is governed by tidal cycle. These conditions presented us with an unique situation in that, historically, we have had little experience in surveying a treatment system with a prolonged retention time. Problems were encountered with equipment and logistics.

CONCLUSION

During the survey period Weyerhaeuser was within permit compliance for Whatman 40 - SCS (<.3#/1000 gal) and for BOD (85% reduction based on the average of the theoretical detention time of seven days). Weyco's analyses of their samples indicated an average BOD reduction of 88% with only one sample of the seven below 85%. Based on DOE analyses of samples collected, BOD reduction for the same period of time was 85% with three of the values less than the 85% requirement.

METHODS

Sampling Locations Four composite samples were collected daily. Fred Howard, Weyco laboratory technician, maintained the industry's samplers. Their influent was secured from an in-line sampler south of the river. The effluent sampler was situated at the tide gate at the outlet from the oxidation ponds. Both of these samplers are air-type permanent installations. The influent sampler is on a time clock and operates periodically while the effluent sampler operates continuously during discharge.

We used the "Surveyor" type portable composite samplers, programmed to pump 75 mls every ten minutes. The influent was taken by attaching a five-foot length of copper tubing to the end of the intake hose and inserting it through a rubber stopper into the wooden pipe on the north side of the river (near the recording pH meter). At the tide gate, the effluent sampler was started and shut down automatically during discharge. Both samplers operated on AC current.

DOE and Weyerhaeuser personnel agreed that for BOD reduction and effluent SCS, the samples obtained were representative.

The Weyco influent and effluent and DOE influent and effluent composite samples were analyzed by Weyerhaeuser and DOE laboratories, and a comparison of data was made.

DISCUSSION

Table I

COMPARISON OF COD VALUES (ppm) FOR DOE SAMPLE TO WEYCO SAMPLE
(DOE DATA)

DATE	INFLUENT			EFFLUENT		
	WEYCO	DOE	±%	WEYCO	DOE	±%
20-21	---	326	---	326	---	---
21-22	689	689	0	317	---	---
22-23	634	554	-12	348	331	-5
23-24	583	583	0	339	331	-2
24-25	552	586	+6	333	349	+5
25-26	481	528	+9	315	323	+2
26-27	618	---	---	307	---	---
27-28	---	784	---	---	303	---
28-1	---	---	---	---	---	---
1-2	831	800	-4	318	303	-5
2-3	746	746	0	326	326	0
3-4	776	745	-4	340	---	---
4-5	649	594	-8	---	364	---
5-6	594	602	+8	388	380	-2
6-7	615	615	0	386	378	-2
7-8	---	863	---	376	376	0
8-9	792	776	-2	337	345	+2

Comparison of COD Values (See Table I and Graph 1) Comparison of influent COD values, using our data on DOE samples and Weyco samples indicate that the samples were similar. A maximum discrepancy (12%) was reported on March 22, 23, 1973. Three other influent samples varied by <10% - >5%. All the remaining samples varied less than 5%.

The effluent COD values for Weyco's sample compared to DOE sample were all within 5%.

Because there was no consistent discrepancy comparing data from industry's sample to DOE's sample, it appears that the differences in data were due to technique and not due to sampler differences. For example, if our samplers were biasing the composites, consistently higher or lower COD values would be expected.

TABLE II A
BOD REDUCTION
WEYCO KRAFT - EVERETT
THEIR DATA - THEIR SAMPLES

INF Date	INF Value ppm	EFF Date	EFF Value ppm	% Reduction
21-22	197	28-1	24	88
22-23	186	1-2	15	92
23-24	182	2-3	15	92
24-25	178	3-4	23	87
25-26	178	4-5	--	--
26-27	205	5-6	21	90
27-28	170	6-7	19	89
28-1	160	7-8	27	83*
Average	182		21	88
Max	205		27	92
Min	160		15	83

BOD REDUCTION BASED ON SEVEN DAY RETENTION - DOE SAMPLE - DOE DATA

INF Date	INF Value ppm	EFF Date	EFF Value ppm	% Reduction
21-22	150	28-1	22	85
22-23	150	1-2	24	84*
23-24	211	2-3	20	91
24-25	166	3-4	--	--
25-26	156	4-5	24	85
26-27	164	5-6	30	82*
27-28	170	6-7	26	85
28-29	146	7-8	29	80*
Average	164		25	85
Max	211		30	91
Min	146		20	80

-- Not Determined
* Below 85% reduction

Comparison of BOD Data Table II A is presented based on a theoretical detention time of seven days. Percent reduction is computed by comparing the value obtained on the influent to the value obtained for the effluent collected seven days later. The average BOD reduction based on Weyco's data on the samples they collected was 88%. The average BOD reduction based on DOE's data on the samples we collected was 85%.

Many other interpretations could be made of the data, for example, DOE's data from Weyco's sample, etc. Another factor which complicates interpreting the data is that the theoretical detention time of seven days is based on a flow rate of 24 MGD. Flows were less during the survey so retention time should have been longer, although not proportionately so. Because of these reasons, the averages are presented in Table II A.

Comparison of Whatman 40 SCS The Whatman 40 SCS data varied somewhat, but compared well overall. The numbers are rather academic, since even the maximum reported #/1000 gallons was only about one-half of what is allowed in their waste discharge permit.

TABLE II B

FLOW AND WHATMAN 40 SCS* ON EFFLUENT

DATE	FLOW MGD	WEYCO SAMPLE THEIR DATA ppm	WEYCO SAMPLE OUR DATA ppm	DOE SAMPLE THEIR DATA ppm	DOE SAMPLE OUR DATA ppm	WEYCO SAMPLE THEIR DATA #/1000 gal	WEYCO SAMPLE OUR DATA #/1000 gal	DOE SAMPLE THEIR DATA #/1000 gal	DOE SAMPLE OUR DATA #/1000 gal
Feb 20-21	11.6	1	3	---	---	.008	.025	---	---
21-22	23.2	1	5	---	---	.008	.042	NC	NC
22-23	23.2	6	1	0	0	.050	.008	NC	NC
23-24	20.9	19	5	0	3	.158	.042	NC	.025
24-25	20.9	0	4	3	11	NC	.033	.025	.092
25-26	20.5	6	11	1	4	.050	.092	.008	.033
26-27	19.7	3	--	2	--	.025	---	.017	---
27-28	21.5	9	13	10	8	.075	.108	.083	.067
28-1	16.8	9	9	10	5	.075	.075	.083	.067
Mar 1-2	21.6	0	4	0	2	NC	.033	NC	.017
2-3	19.1	14	21	13	--	.117	.175	.108	---
3-4	18.1	0	1	--	--	NC	.008	---	---
4-5	21.7	---	---	---	1	---	---	---	.008
5-6	21.4	2	3	0	0	.017	.025	NC	NC
6-7	23.1	0	1	0	0	NC	.008	NC	NC
7-8	25.6	1	0	0	6	.008	NC	NC	.050
8-9	21.2	5	0	0	0	.042	NC	NC	NC
Average	20.6	4.8	5.4	3.0	2.6				

Conclusion: Max ±SCS in effluent = .175#/100 gallons Weyco sample - our analysis 3-2 - 3-3

* Computed by #/1000 gallons = ppm x 8.34×10^{-3}

NC Not Computed

TABLE III

FIELD DATA

DATE	INFLUENT	EFFLUENT
2-24	pH=5.5 T-29.5 Time = 0910	T=16
2-25	T=29 pH=6.2 Time = 1110	T=17
3-6	T=29.5 Time = 0845	T=16
3-7	T=31 Time = 0850	T=17
3-8	T=31 Time 0845	T=17

Difficulties Encountered

1. Loss of samples due to mechanical failure of DOE samplers. Several of the early effluent samples were not secured because the pump failed to shut off.

2. Samples delayed in shipment. Samples shipped from Everett failed to get to Olympia on schedule. Transfers in Seattle miscarried and one sample was delayed four days. This problem was solved by shipping samples from Seattle.

3. Mill shutdown. Difficulties in the mill caused atypical samples on 2-20 through 2-21.

4. Power outage. Tripping a circuit breaker and loss of electricity was responsible for not obtaining one sample by Weyco's sampler.

5. Physical disconnection of sample hose from composite container. This was corrected by drilling an undersized hole in the cap of a cubitainer and inserting the sample hose into the cubitainer retained by the cap.

Grab Samples On March 16 and March 17, grab samples were taken of the effluent for total and fecal coliform. Values for total were 23,000 and 17,000 colonies/100 mls. Fecal values were both less than 20 colonies/100 mls.

On March 8, a single grab sample was taken of the effluent and analyzed for pH, color, conductivity, and PBI. The following data was reported.

pH = 7.1
Color 3790
Conductivity (μmhos/cm) = 2400
PBI = 420

Temperature data were also taken - see Table III.

TABLE IV
LAB DATA SUMMARY
WHATMAN 40 SCS (ppm)

DATE	WEYCO SAMPLE				DOE SAMPLE			
	INFLUENT		EFFLUENT		INFLUENT		EFFLUENT	
	DOE DATA	WEYCO DATA	DOE DATA	WEYCO DATA	DOE DATA	WEYCO DATA	DOE DATA	WEYCO DATA
20-21	---	---	3	1	47	54		
21-22	67	65	5	1	67	67	[illegible]	1
22-23	113	107	1	6	94	88	0	0
23-24	148	163	5	19	109	124	3	0
24-25	104	126	4	0	100	86	11	3
25-26	98	79	11	6	73	64	4	1
26-27	---	78	--	3	---	71	--	2
27-28	70	69	13	9	54	37	8	10
28-1	69	66	9	9	115	37	5	10
1-2	90	104	4	0	86	88	2	0
2-3	83	118	21	14	160	100	--	13
3-4	99	83	1	0	86	72	--	--
4-5	60	147	--	--	139	88	1	--
5-6	126	116	3	2	117	114	0	0
6-7	89	118	1	0	80	109	0	0
7-8	---	---	0	1	164	123	6	0
8-9	129	140	0	5	104	114	0	0

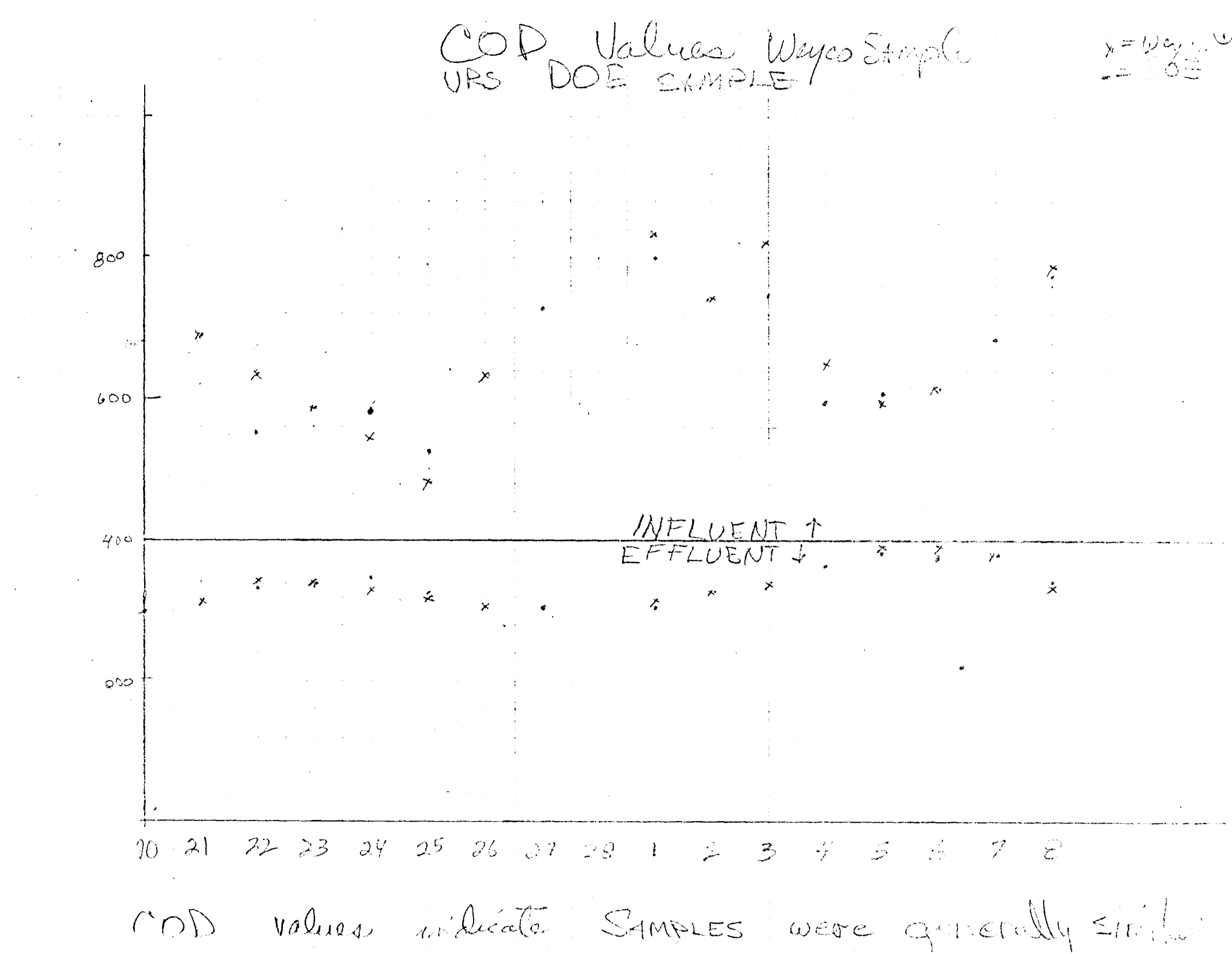
BOD (ppm)

20-21			19	18	61	58		
21-22	144	197	19	17	150	170	--	--
22-23	162	186	21	23	150	182	21	23
23-24	162	182	27	18	211	193	23	18
24-25	161	178	24	21	166	182	21	23
25-26	193	178	32	25	156	174	27	25
26-27	195	205	25	23	164	182	24	22
27-28	163	170	26	21	170	178	24	19
28-1	144	160	24	24	146	163	22	24
1-2	214	190	26	15	188	176	24	14
2-3	179	194	19	15	184	204	20	14
3-4	175	186	21	23	157	178	--	--
4-5	160	189	--	--	175	178	24	16
5-6	190	186	33	21	173	189	30	18
6-7	207	201	18	19	219	204	26	18
7-8	---	---	25	27	165	184	29	27
8-9	160	---	23	--	193	---	24	--

TABLE IV (cont.)

GOOCH SCS (ppm)

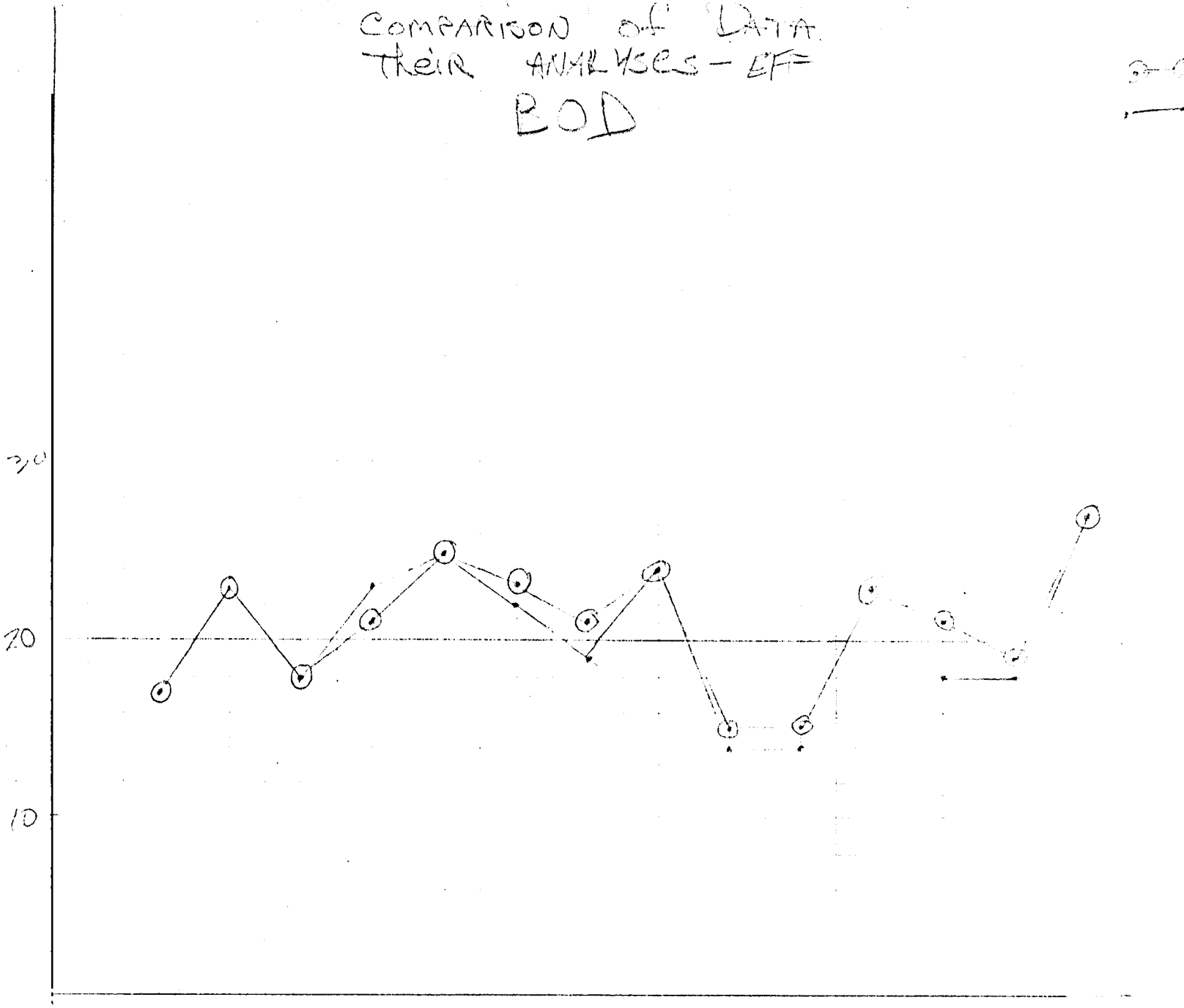
DATE	THEIR INFLUENT		THEIR EFFLUENT		OUR INFLUENT		OUR EFFLUENT	
	OUR DATA	THEIR DATA	OUR DATA	THEIR DATA	OUR DATA	THEIR DATA	OUR DATA	THEIR DATA
20-21	---	---	15	10	67	148	---	---
21-22	85	110	14	24	96	72	---	---
22-23	159	272	23	6	128	260	32	0
23-24	120	214	37	30	---	208	35	42
24-25	153	124	39	34	127	112	35	30
25-26	125	110	47	26	105	98	51	24
26-27	130	116	55	46	106	106	56	0
27-28	---	98	---	18	81	58	35	16
28-1	90	86	35	16	72	82	30	12
1-2	110	124	38	30	105	98	62	14
2-3	113	154	32	46	105	148	30	62
3-4	115	120	16	20	87	94	---	---
4-5	80	178	---	--	164	160	25	4
5-6	145	162	26	24	177	152	26	28
6-7	132	144	27	26	113	134	15	26
7-8	---	---	27	18	135	134	15	24
8-9	152	148	23	22	196	78	25	16



COD values indicate SAMPLES were generally sim

COMPARISON OF DATA
THEIR ANALYSES – EF=

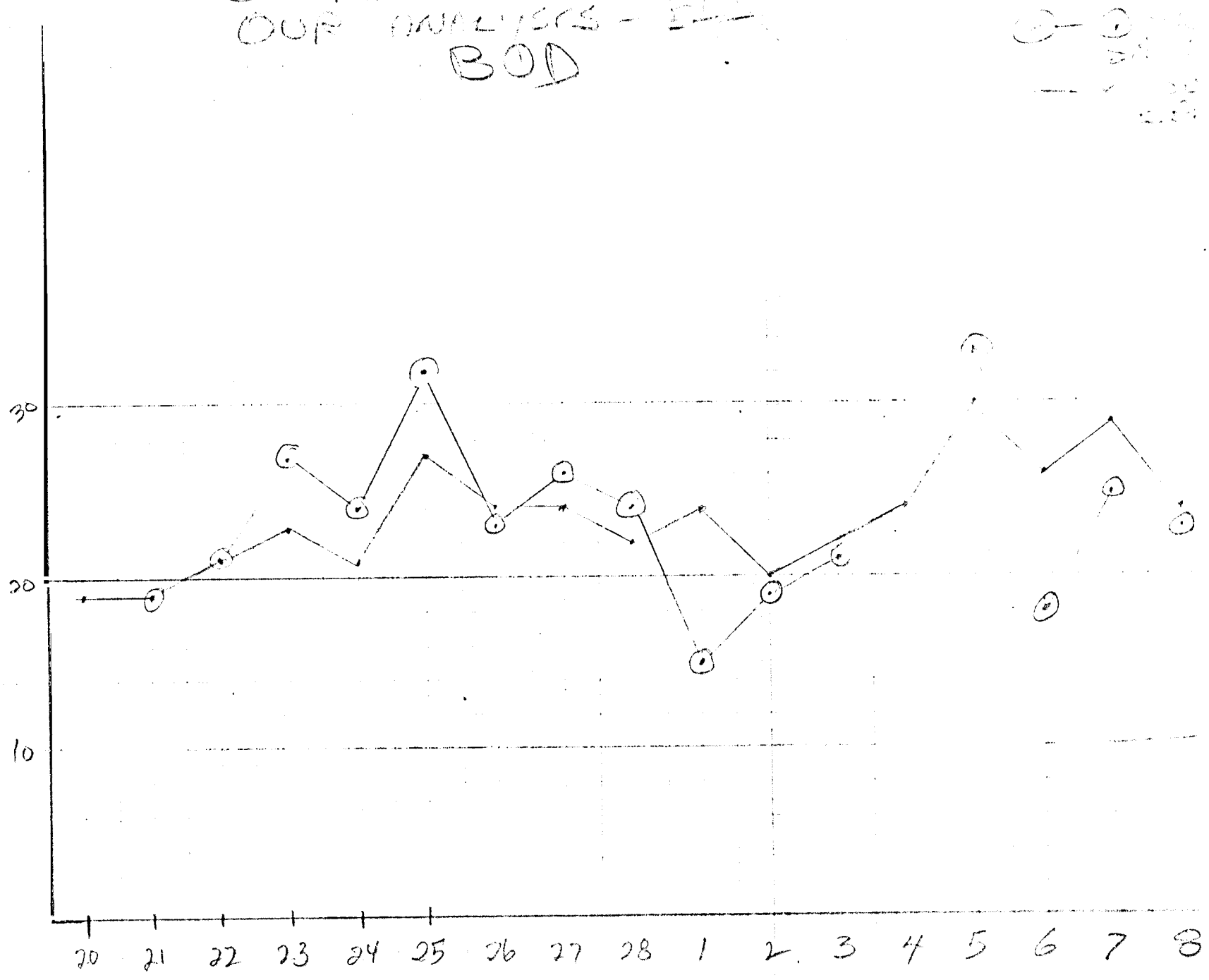
BOD



SAMPLES SIMILAR; theirs slightly higher

8

COMPARISON OF DATA
OUR ANALYSIS - [illegible]
BOD



No observable TREND

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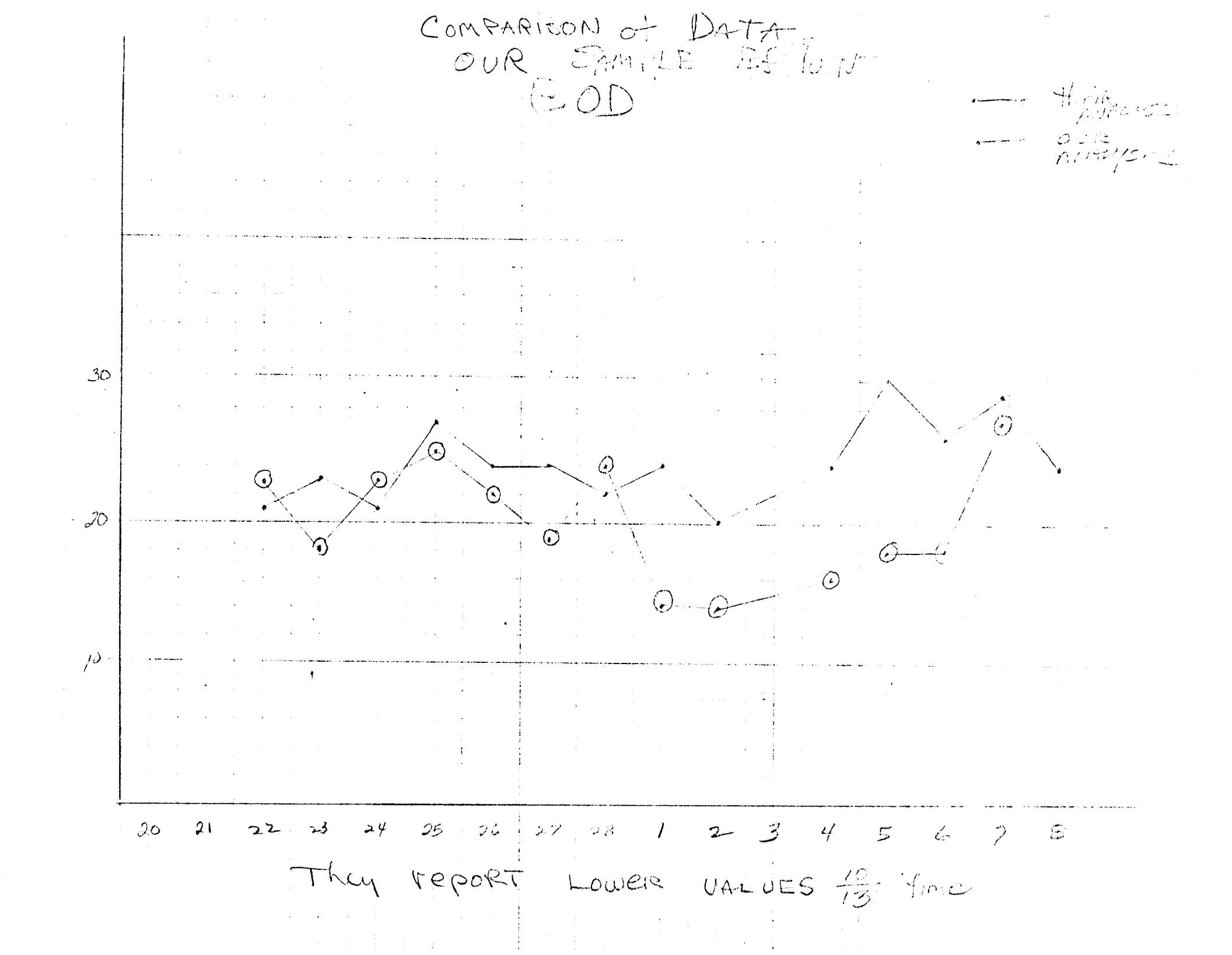
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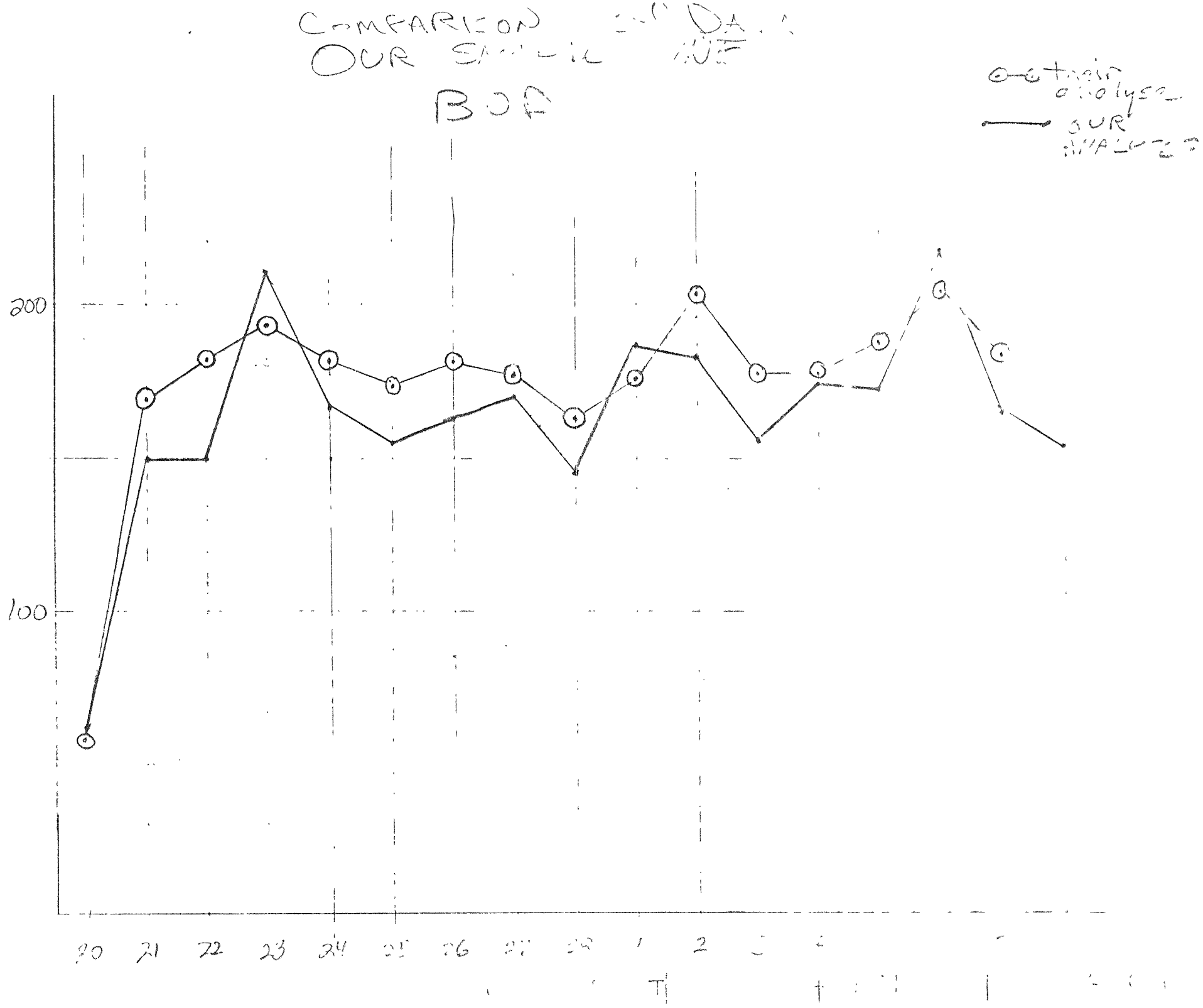
They report Lower VALUES 10/13 time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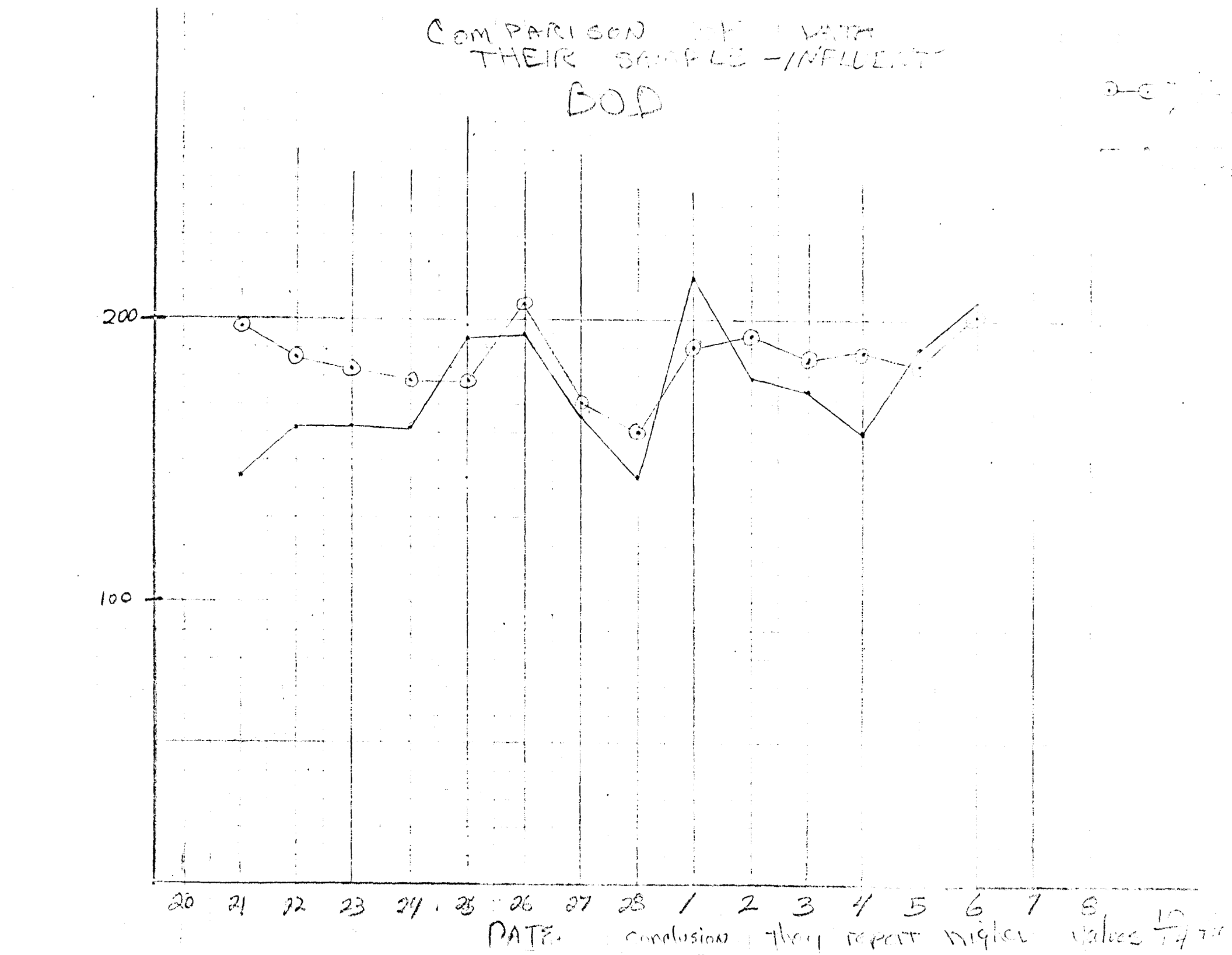
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THEIR SAMPLE - INFLUENT
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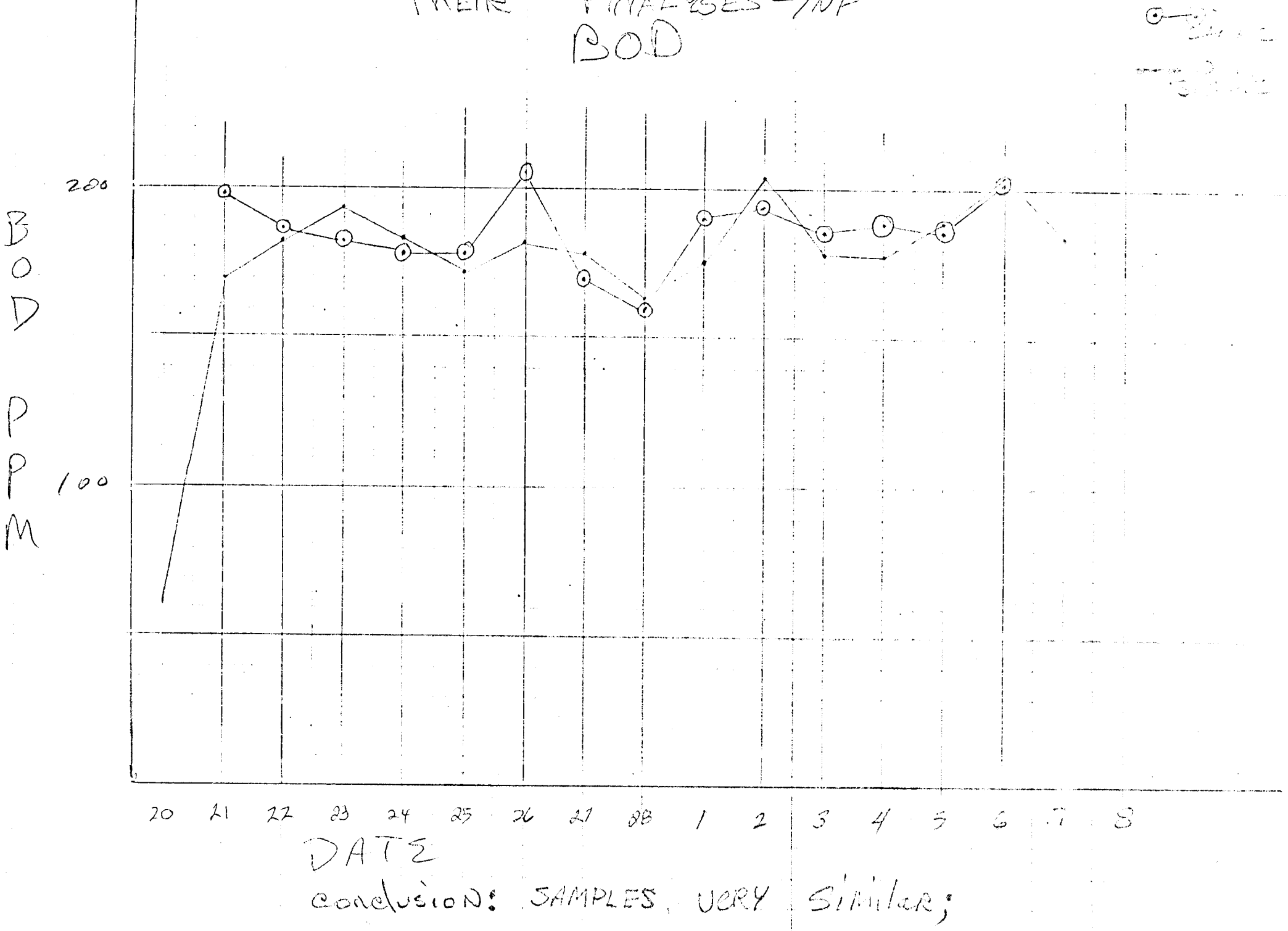
conclusion they report higher values

COMPARISON of SAMPLES THEIR FINALYSES - INF

BOD



conclusion: SAMPLES VERY similar;

COMPARISON OF SAMPLES
OUR ANALYSES - [illegible]
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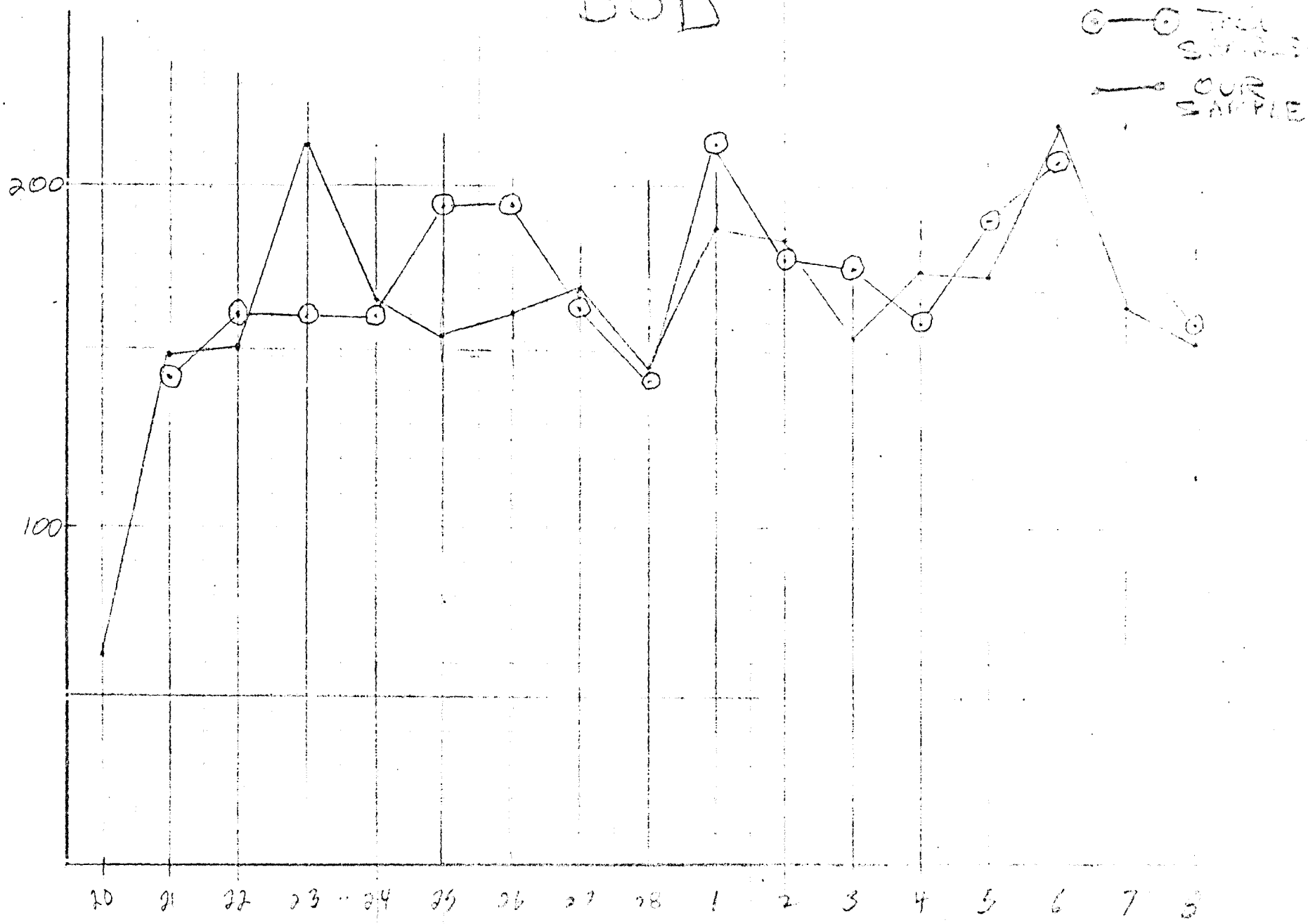

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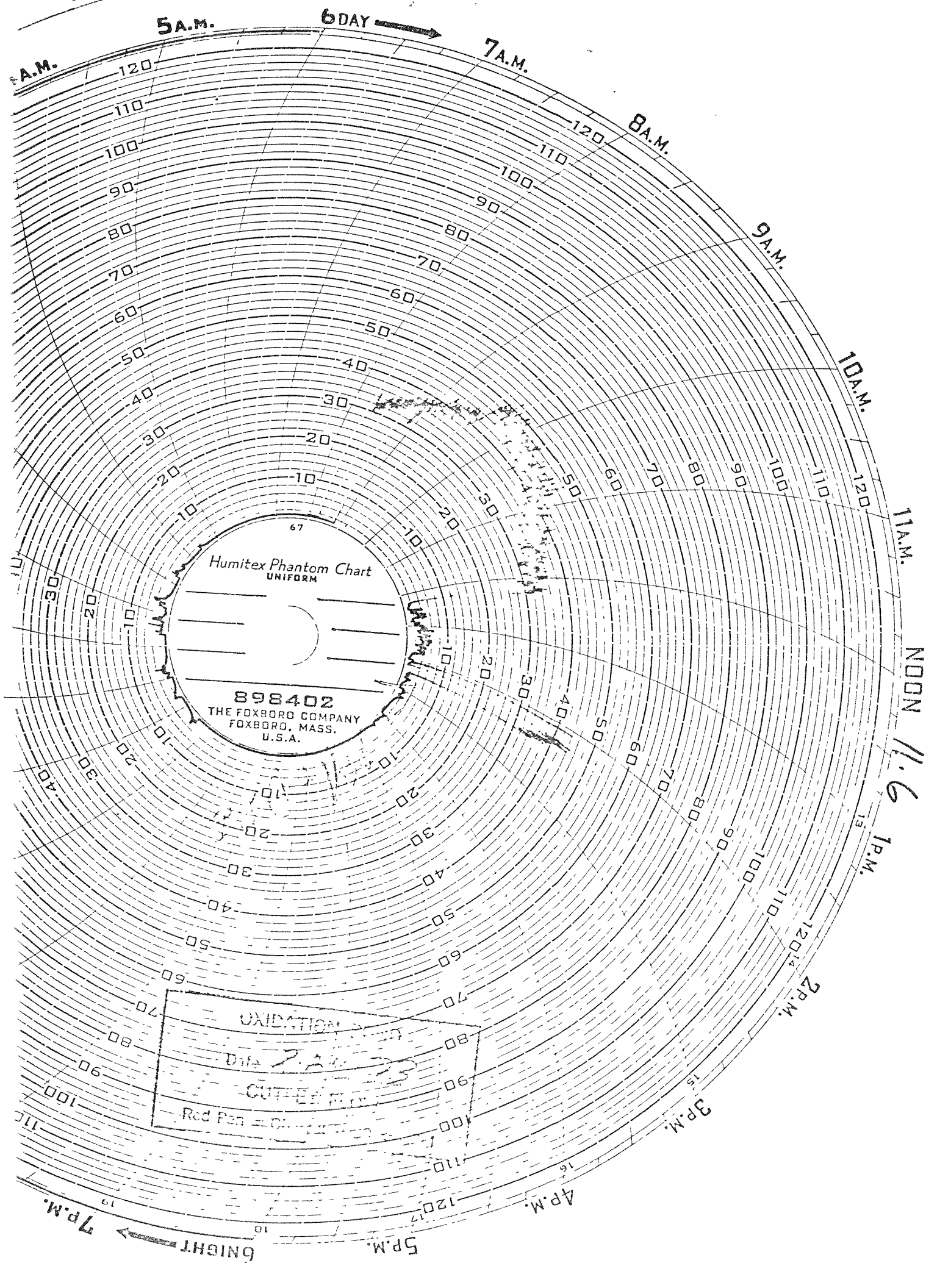
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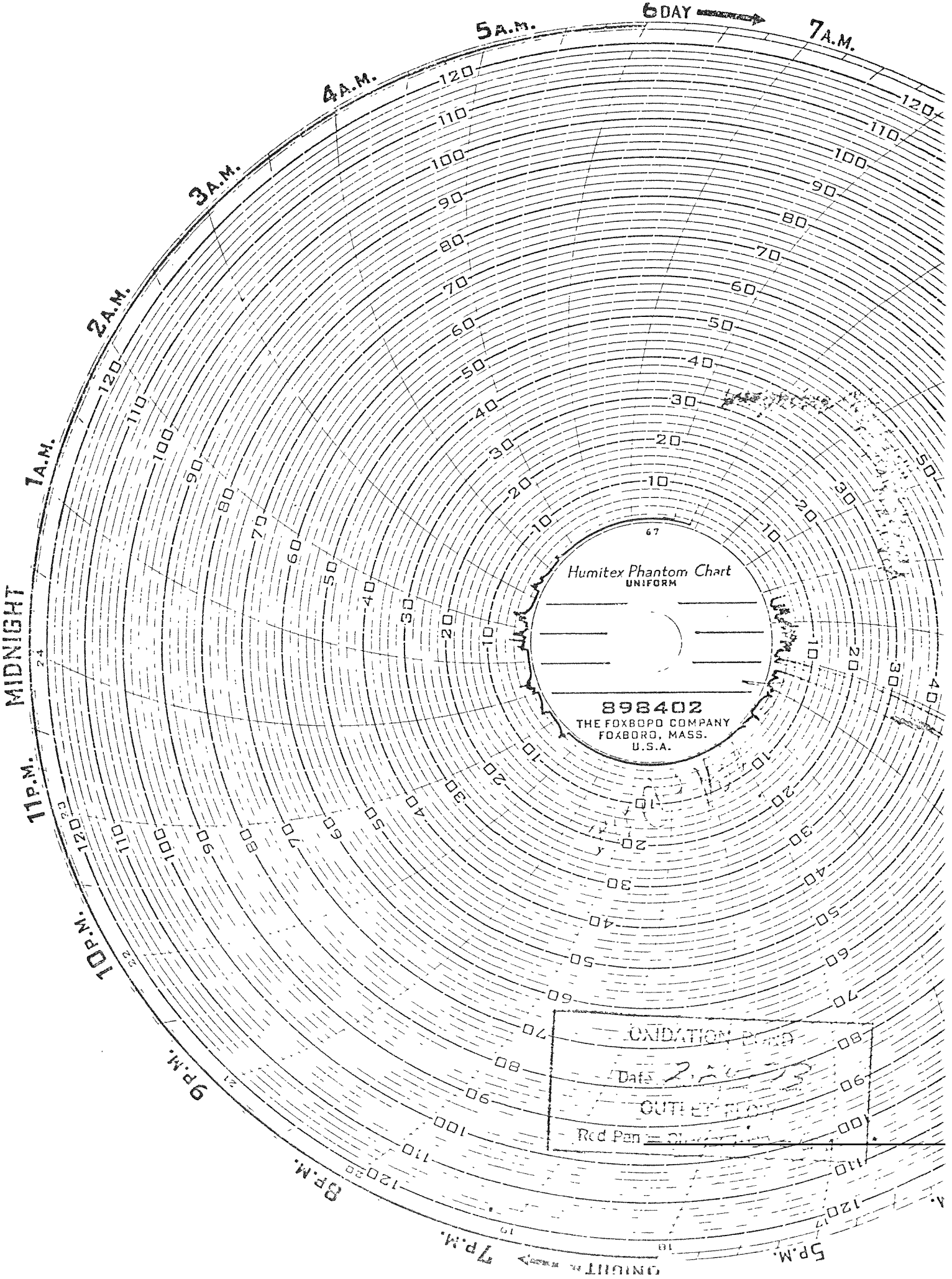
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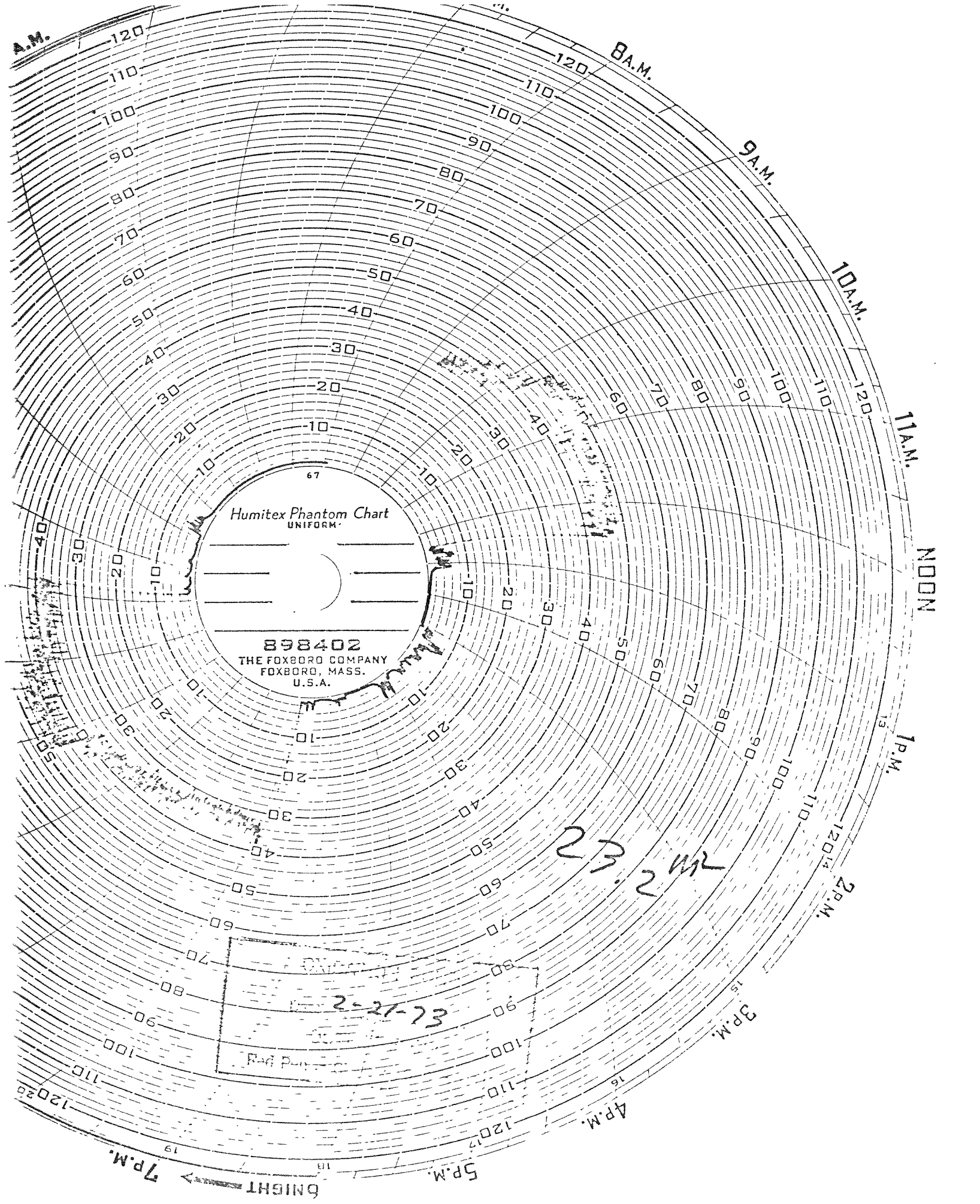
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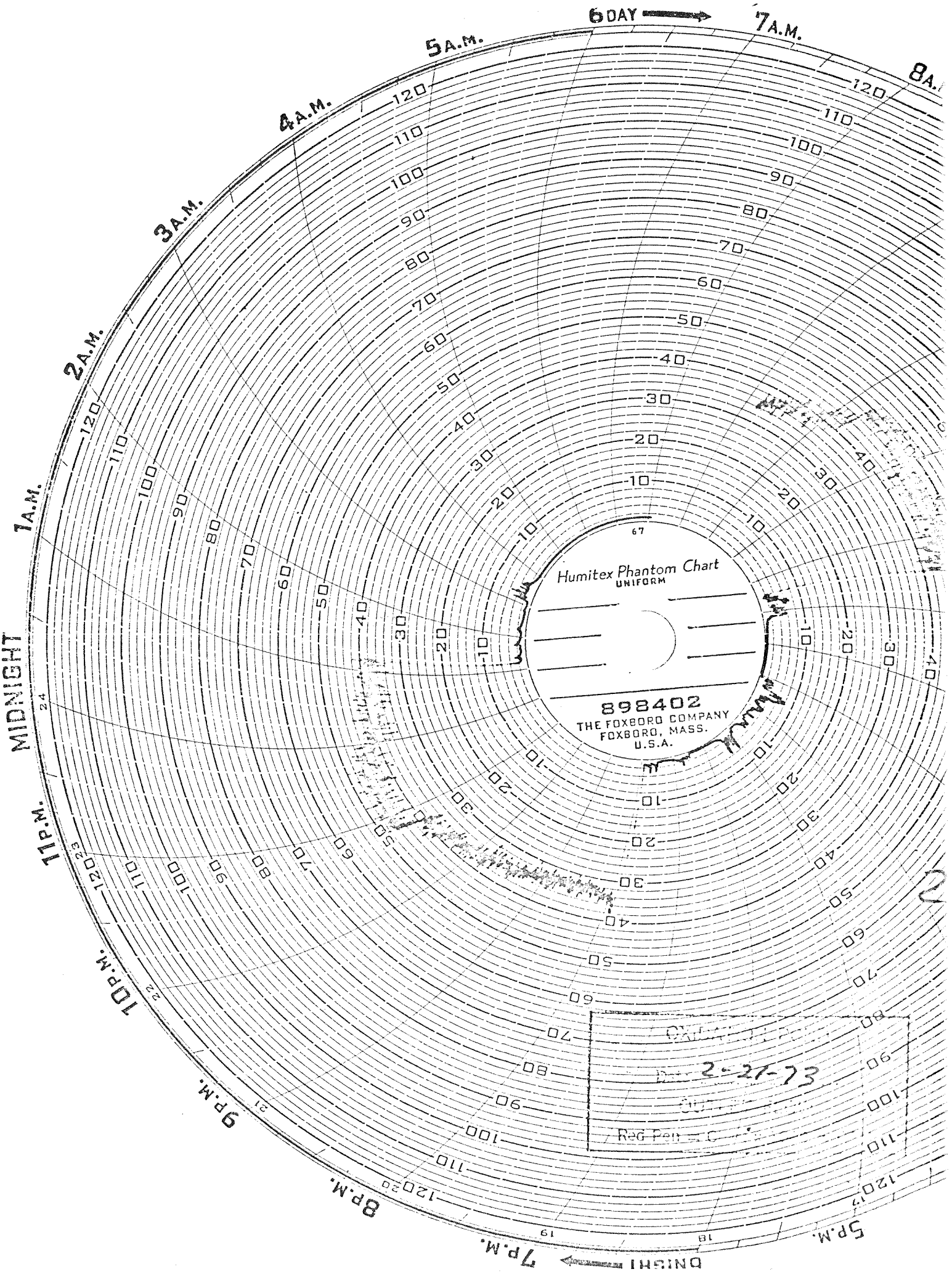
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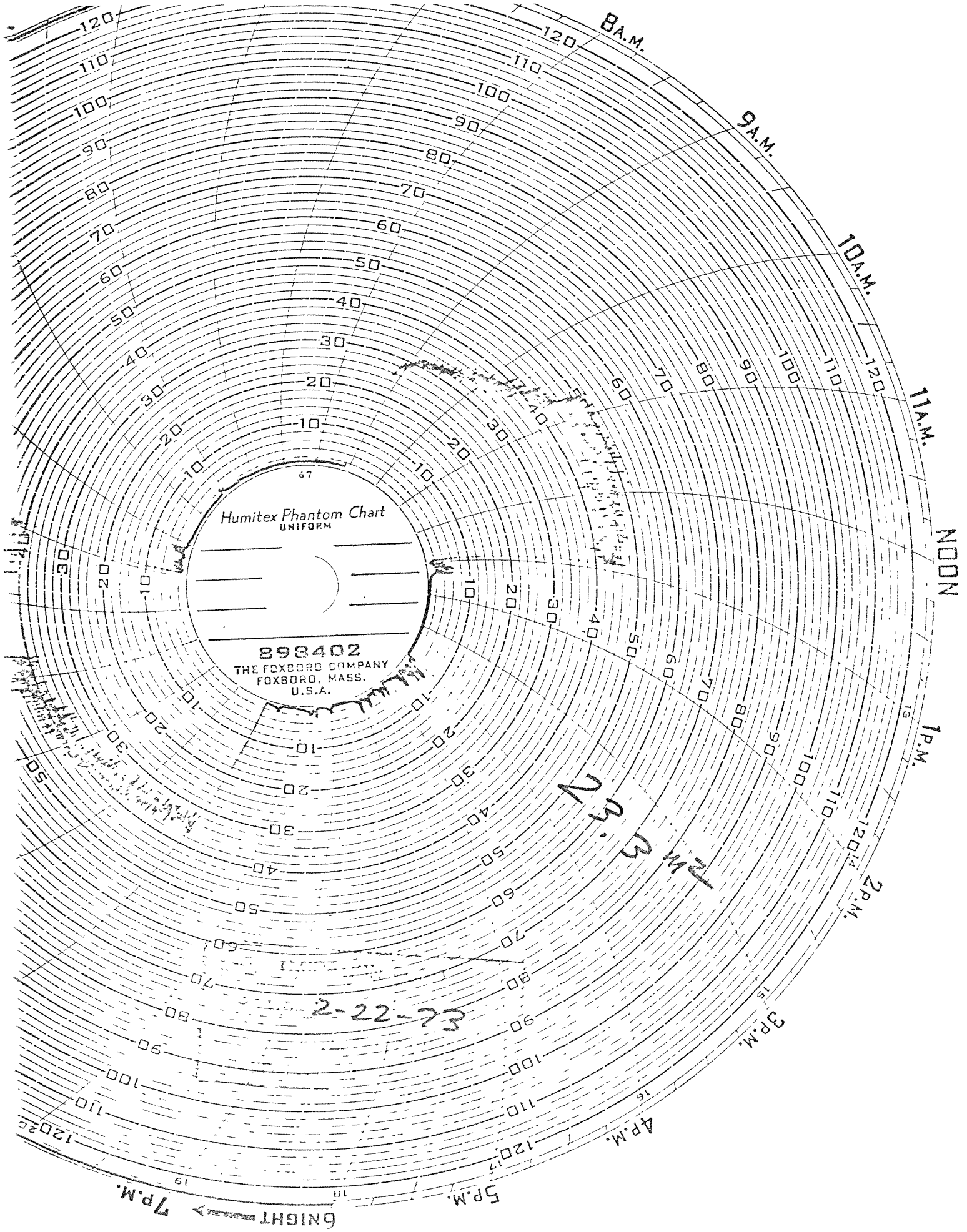
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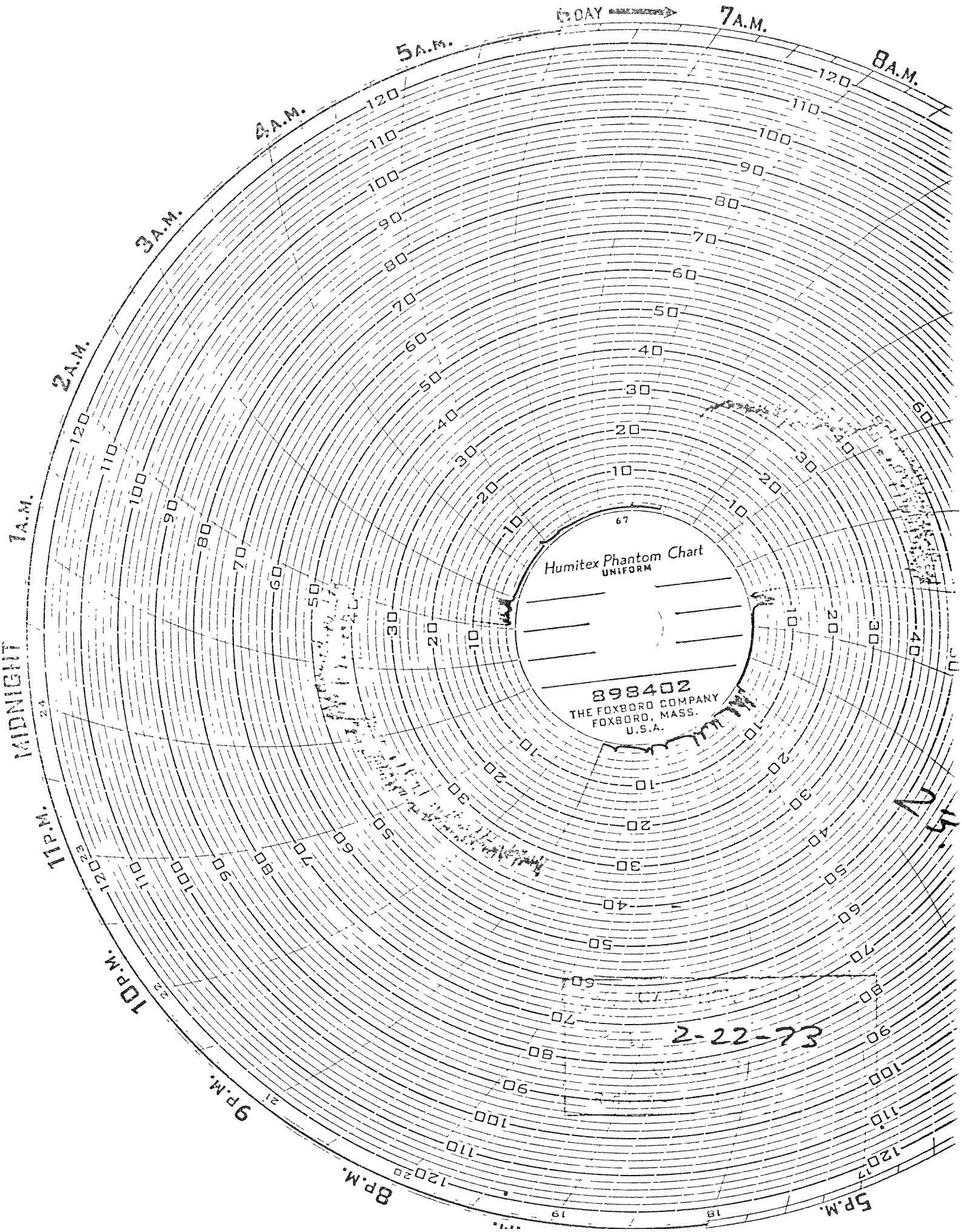
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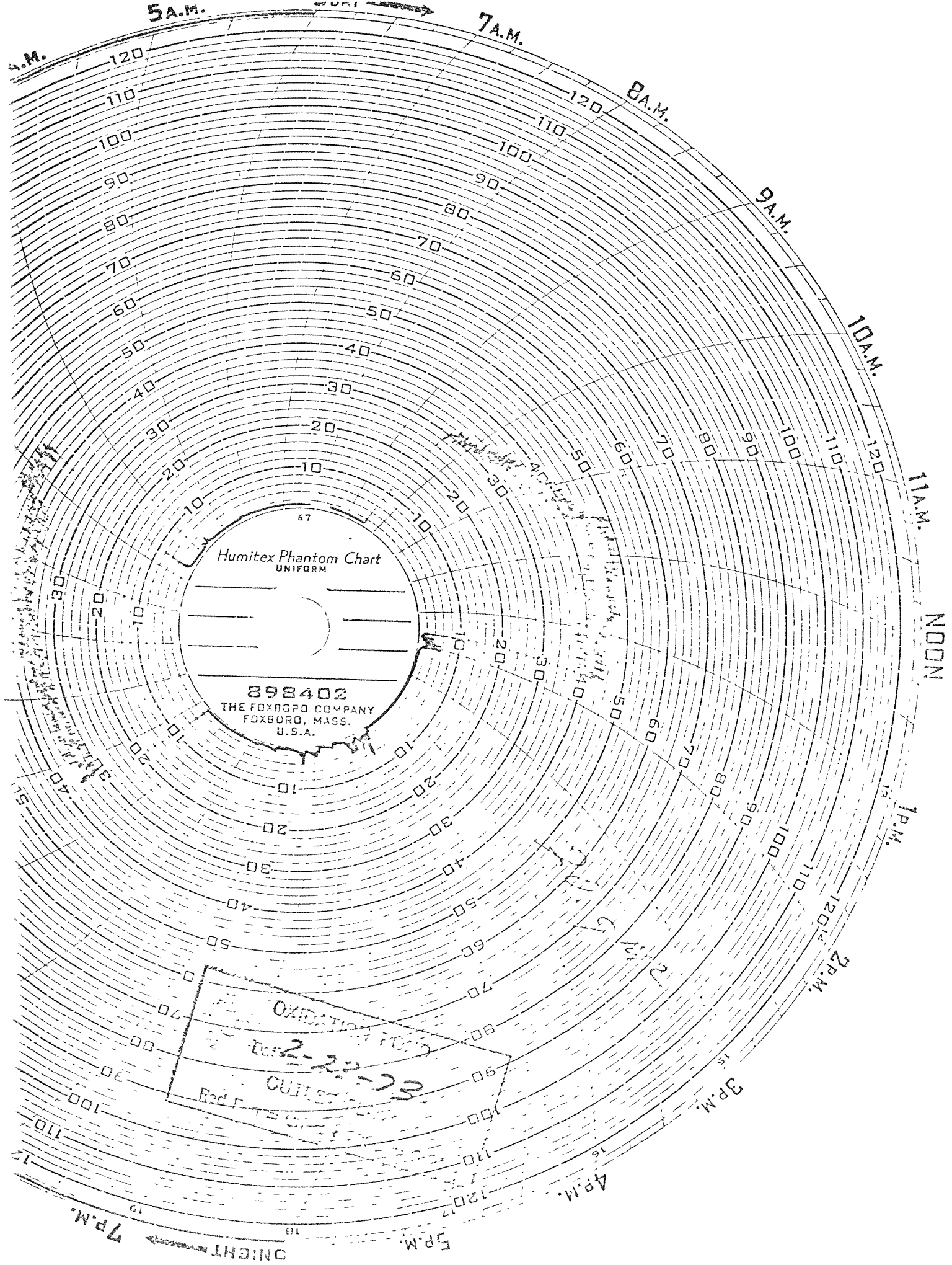
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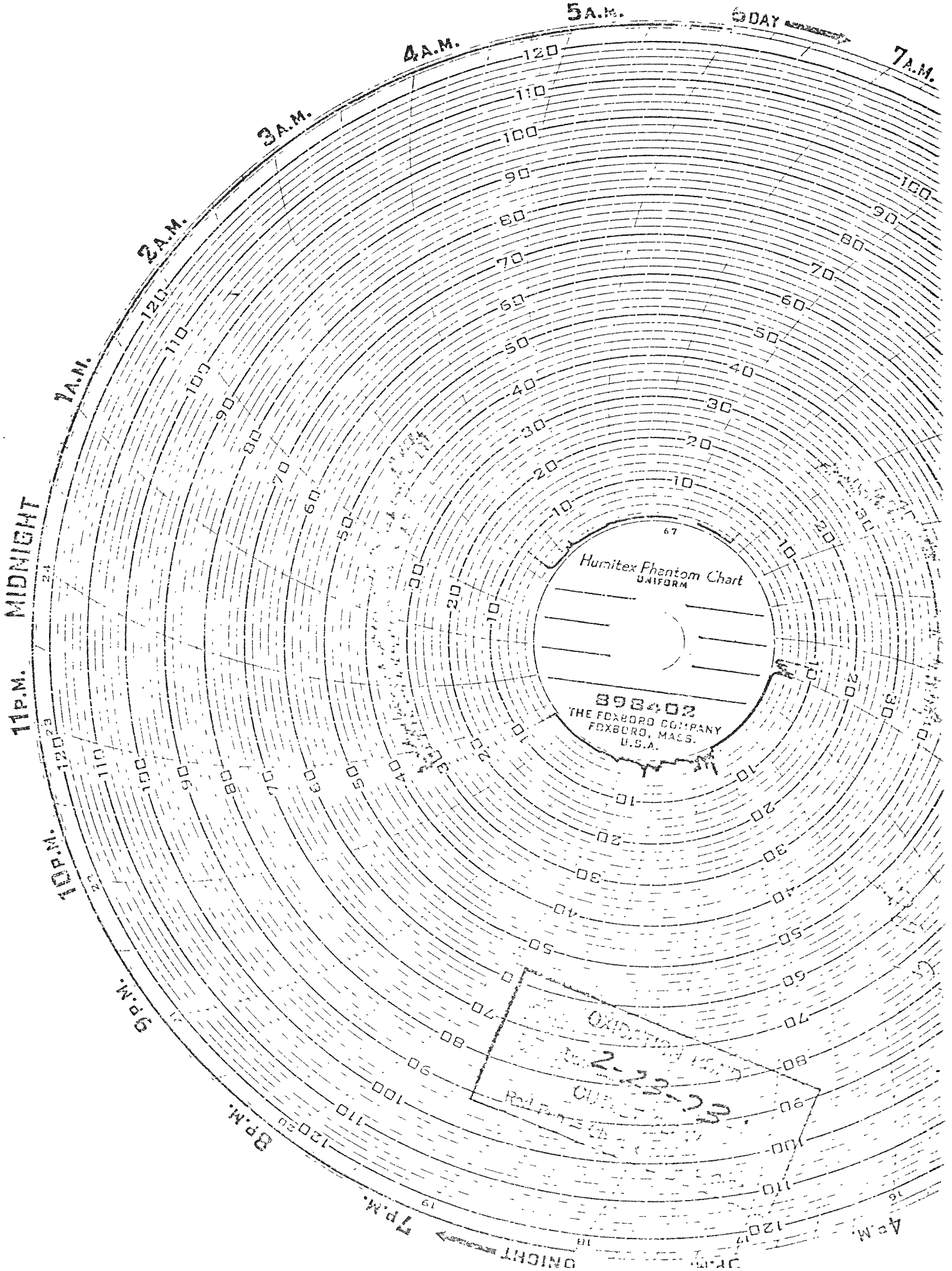
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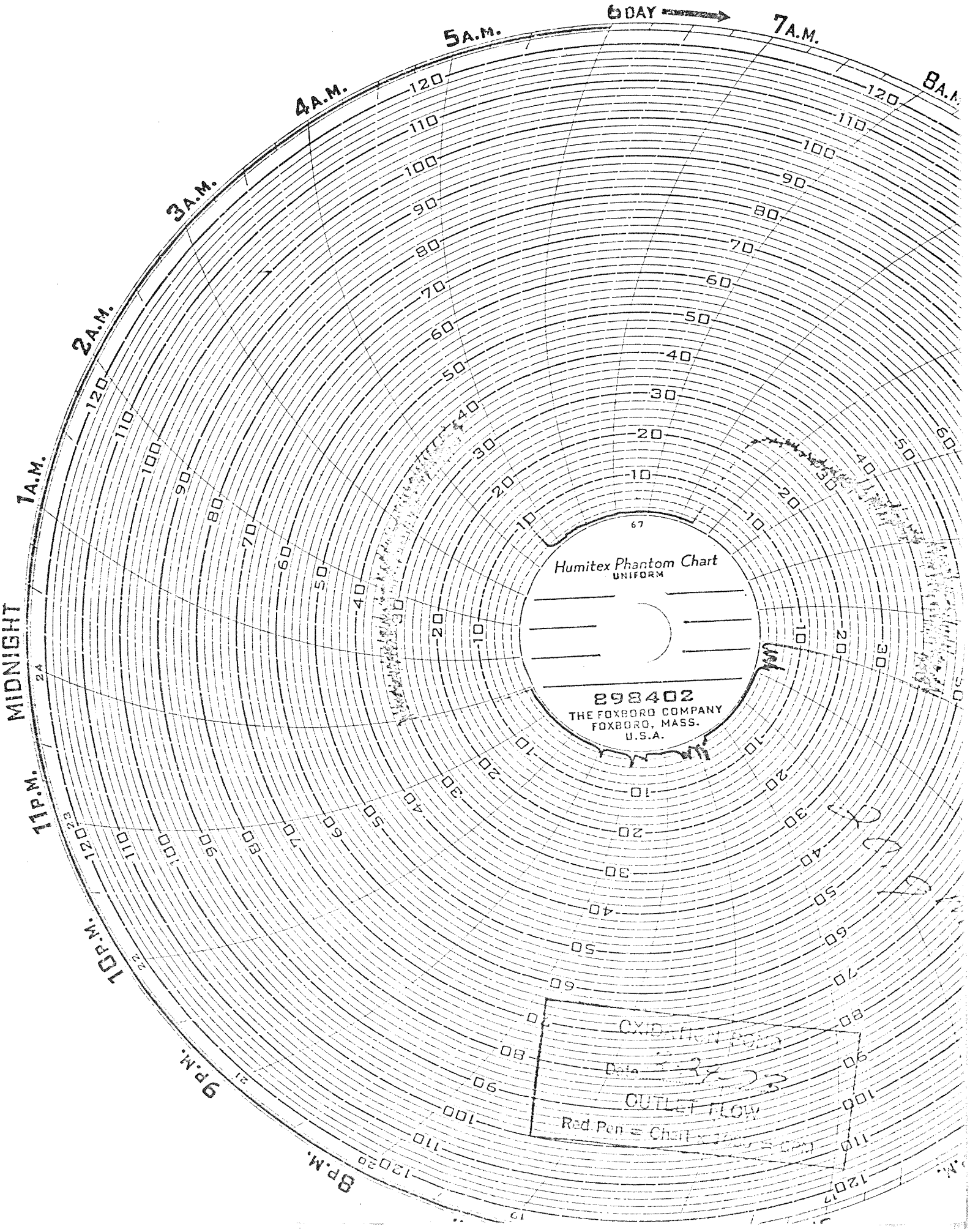
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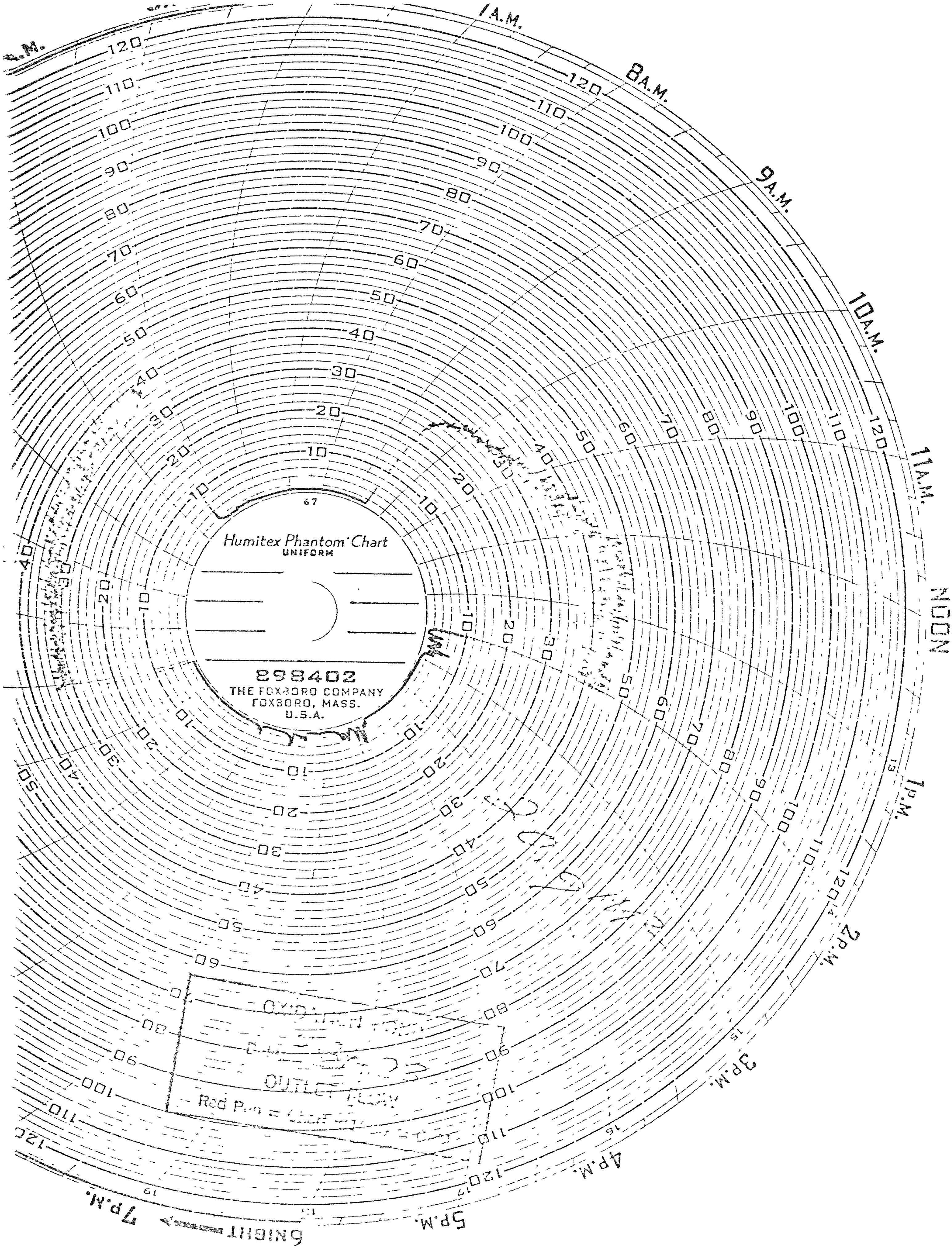
Red Pen = Chart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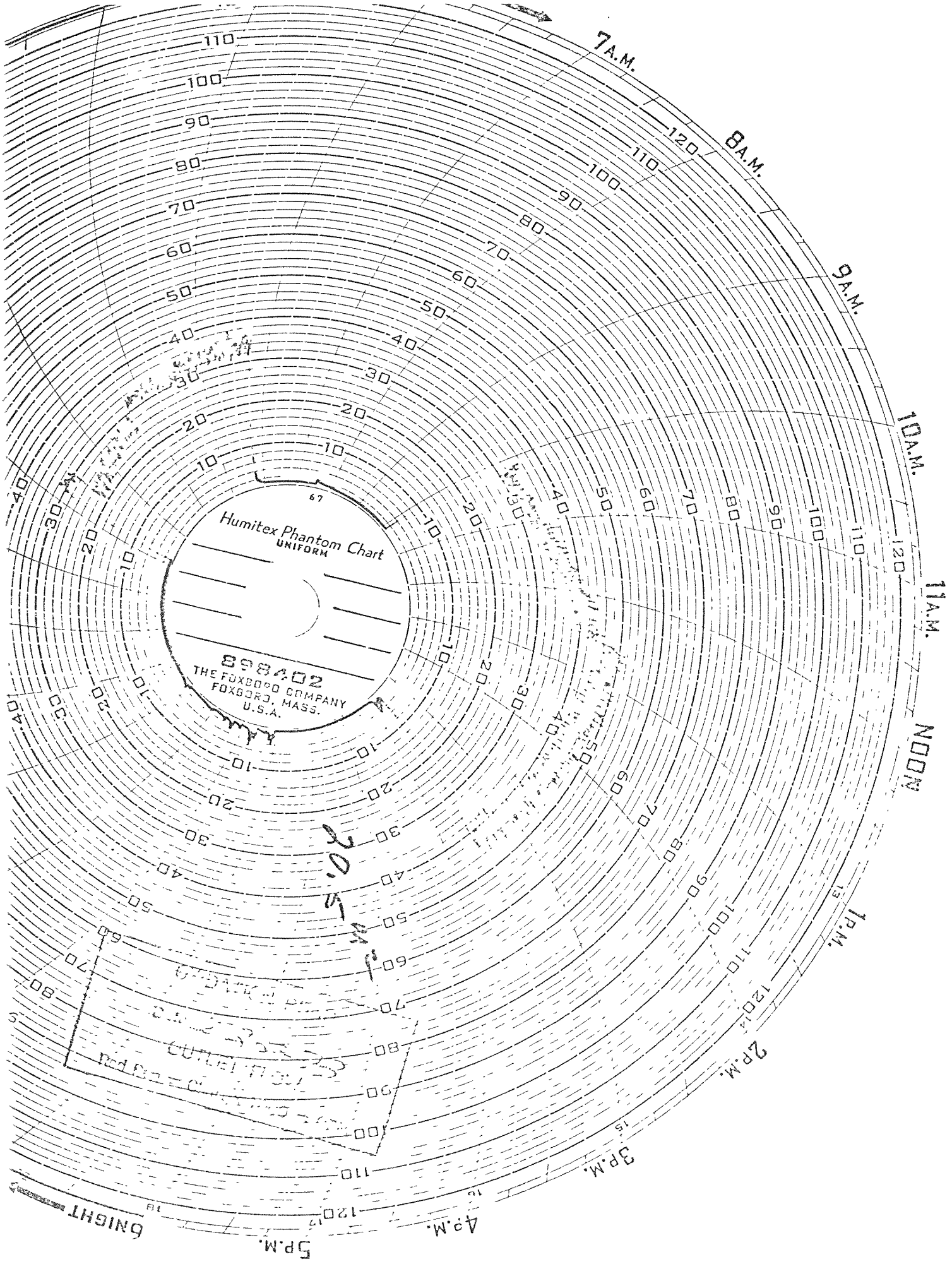
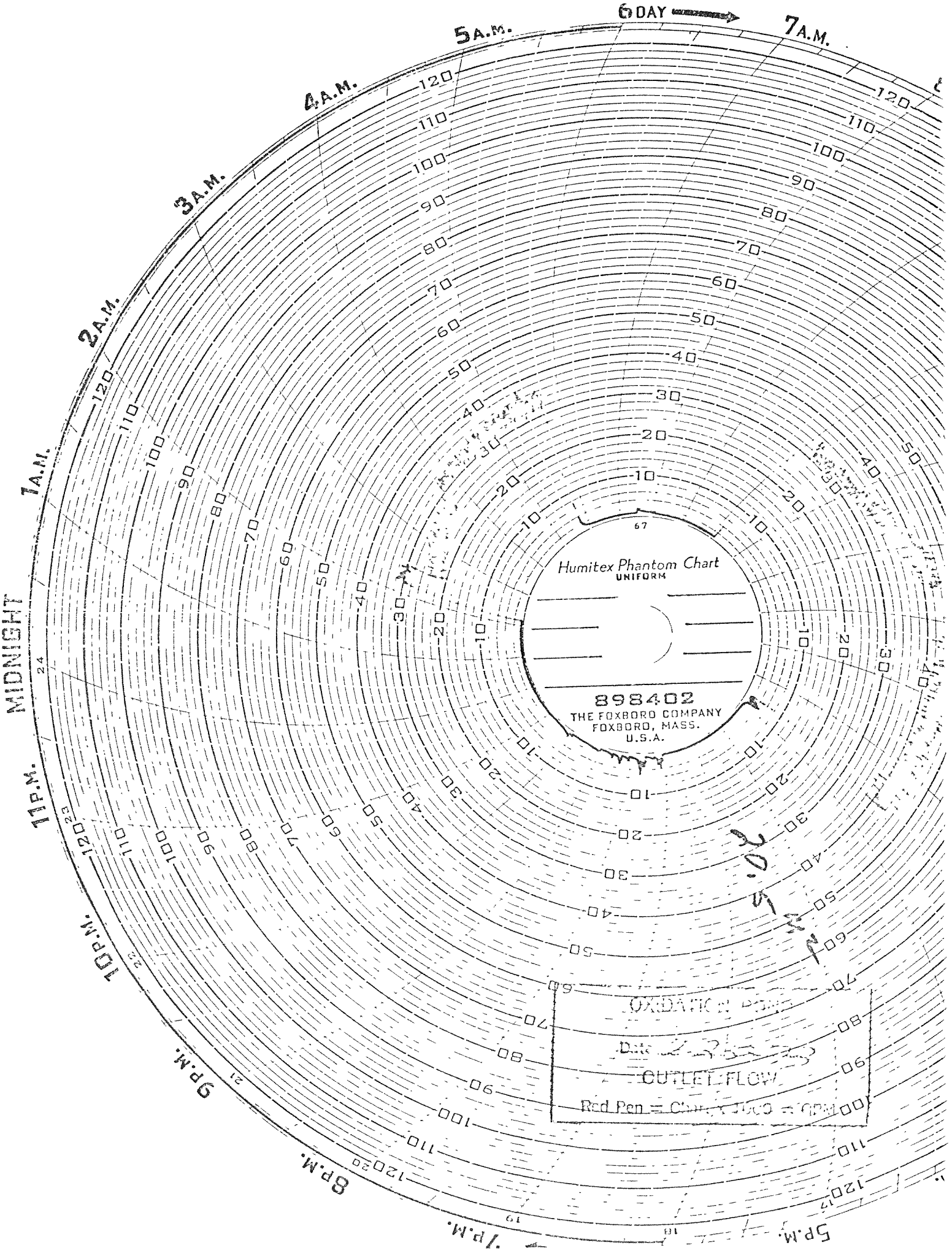
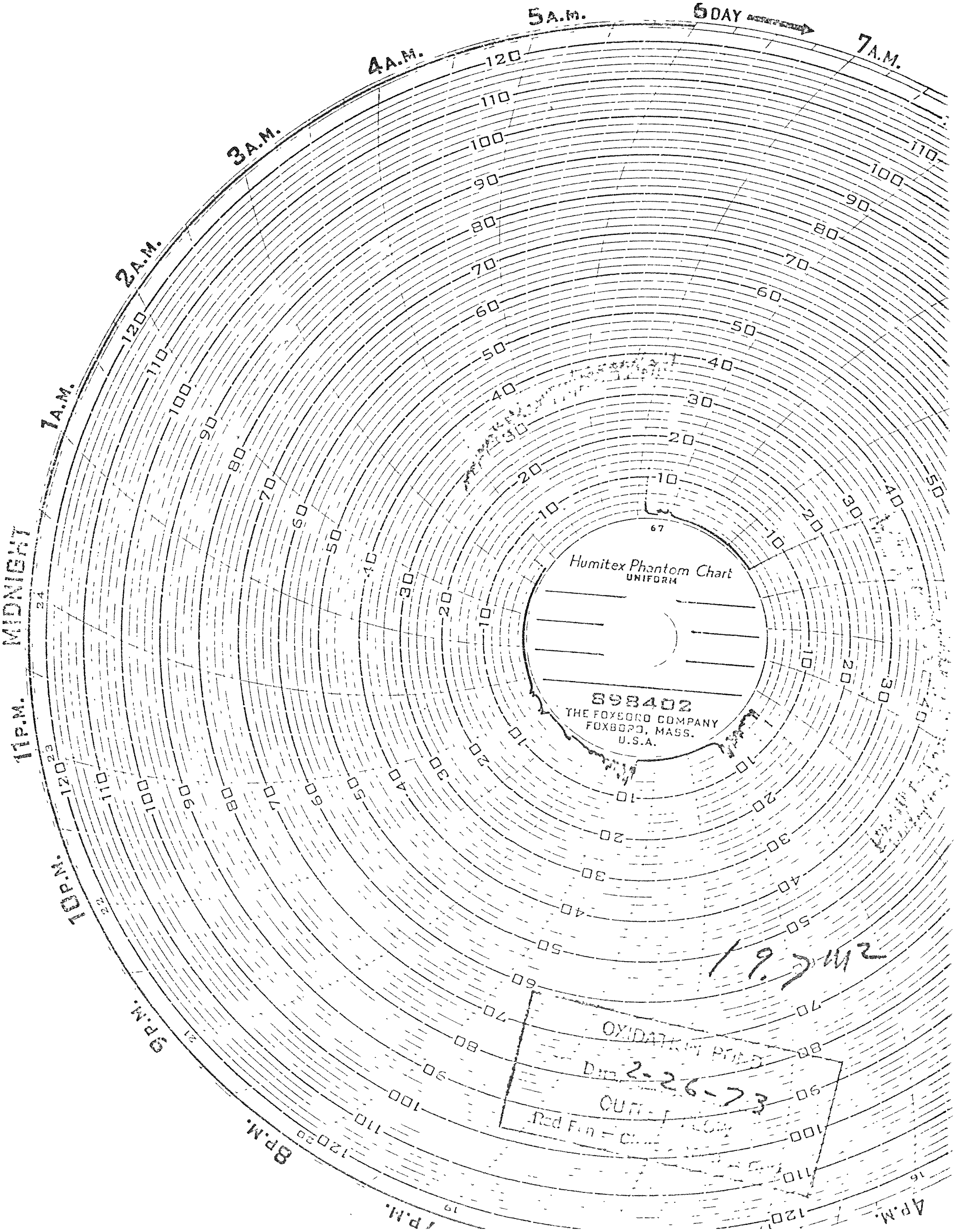
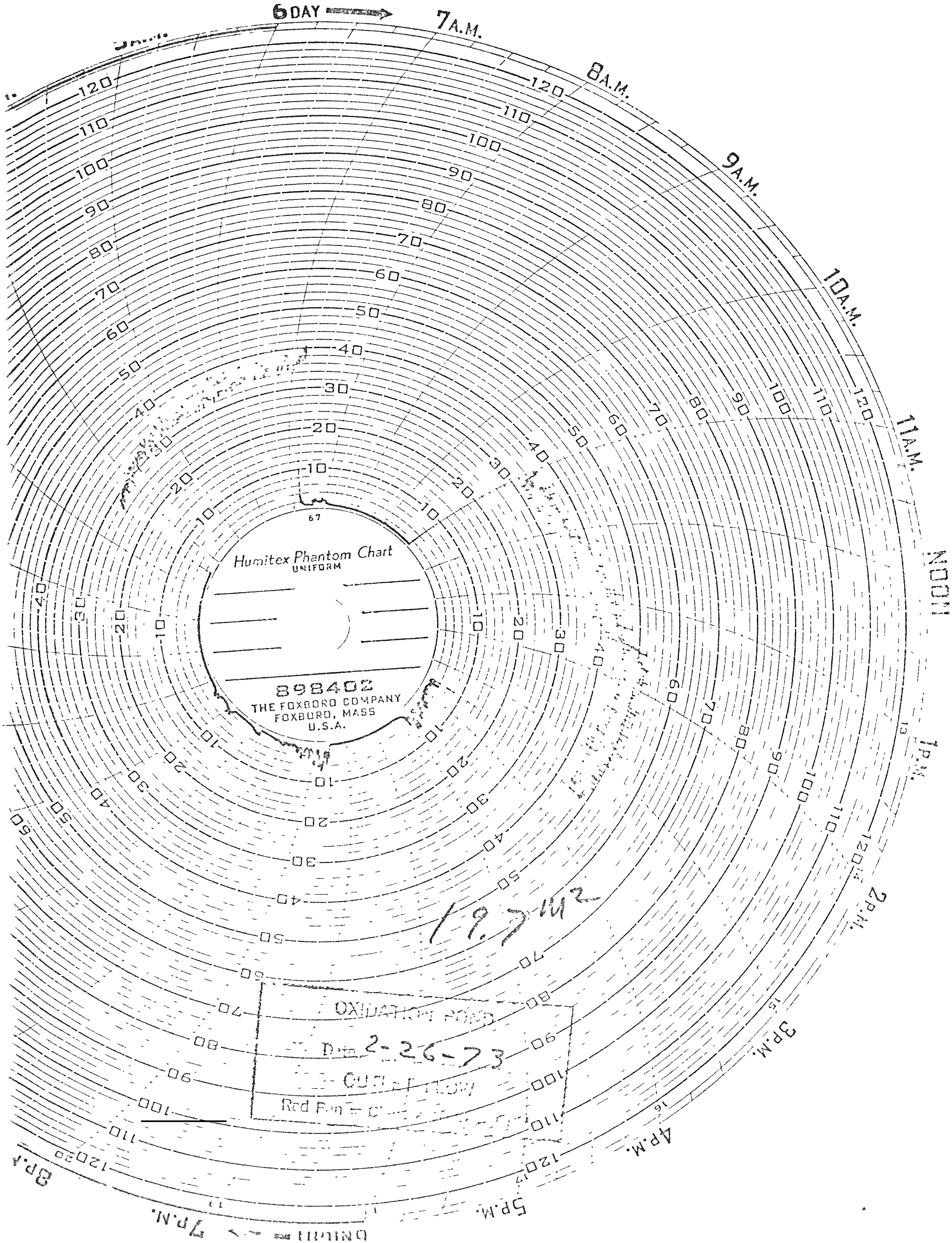
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 NIGHT
7 P.M.
OUTLET FLOW

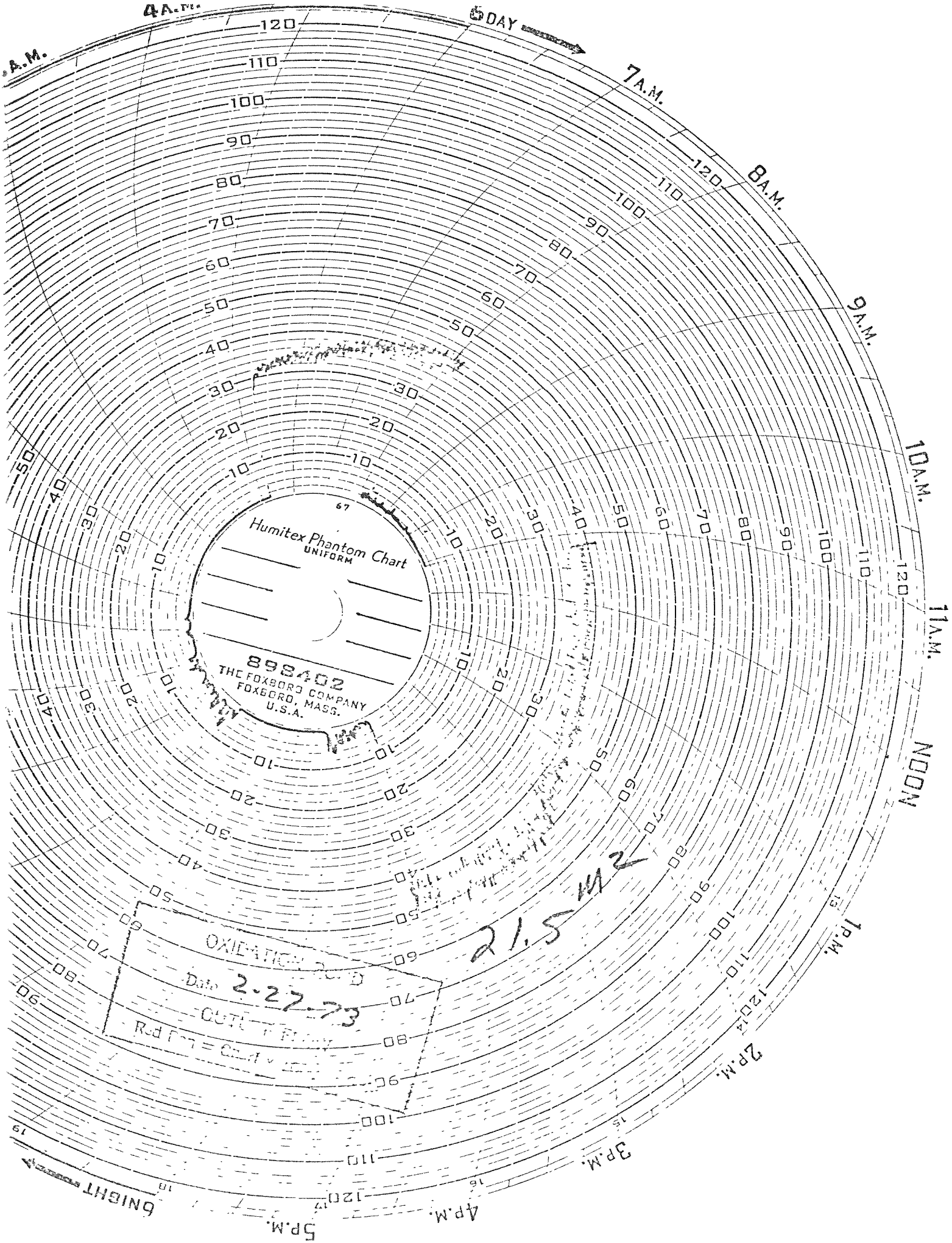

Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 NIGHT

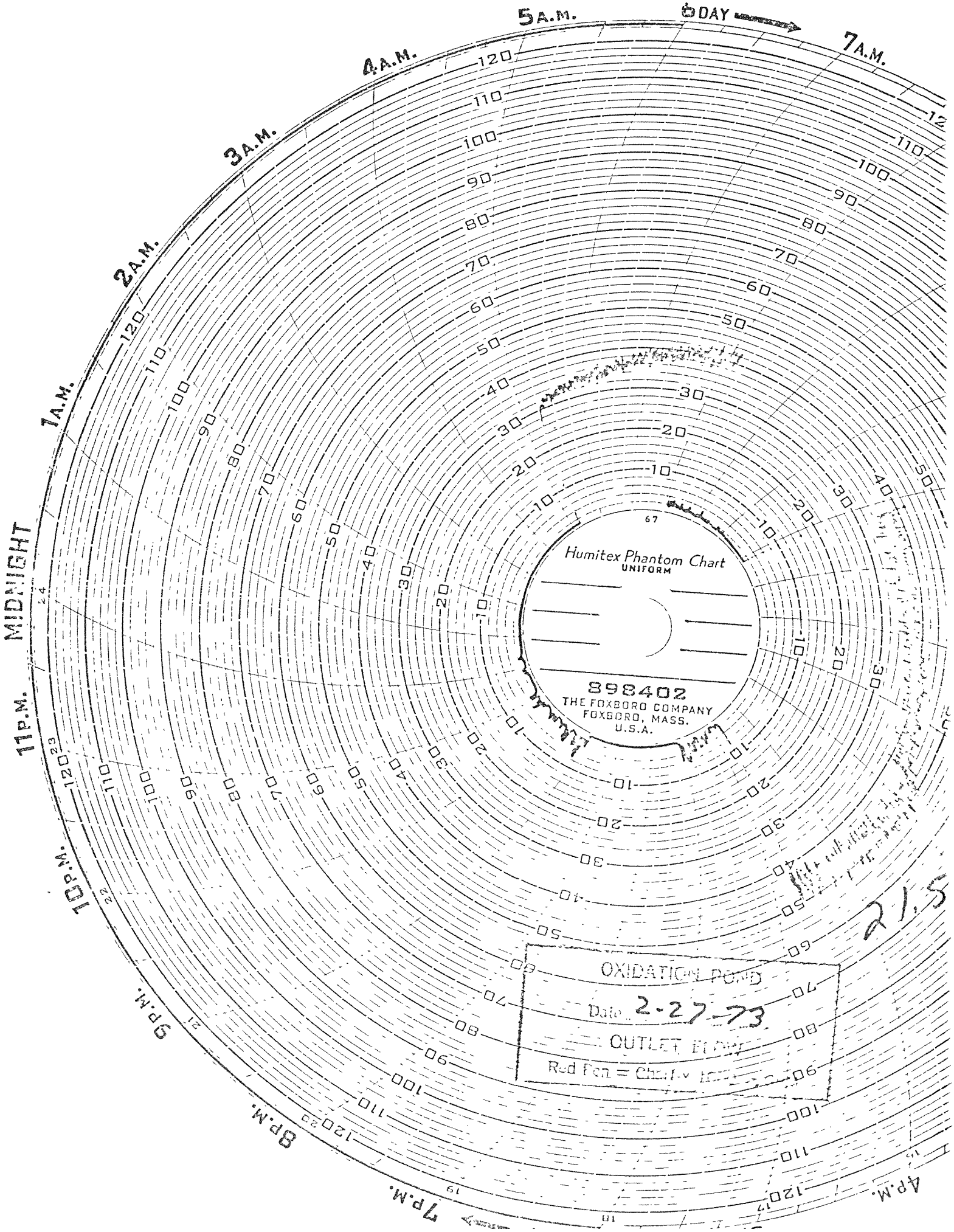

6 DAY
5 A.M.
7 A.M.
4 A.M.
3 A.M.
2 A.M.
1 A.M.
MIDNIGHT
11 P.M.
10 P.M.
9 P.M.
8 P.M.
7 P.M.
5 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
OXIDATION
Date
OUTLET FLOW
Red Pen =

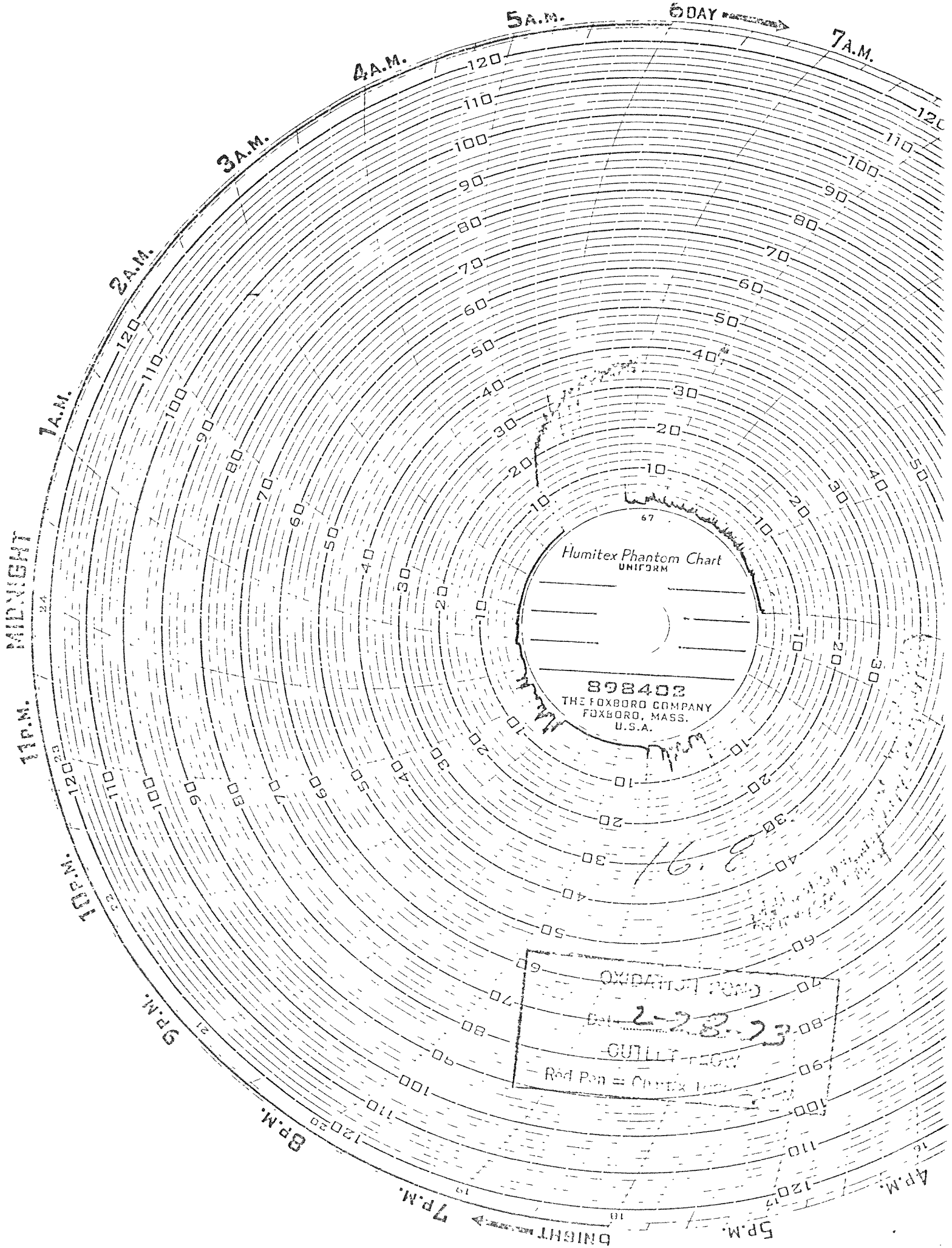


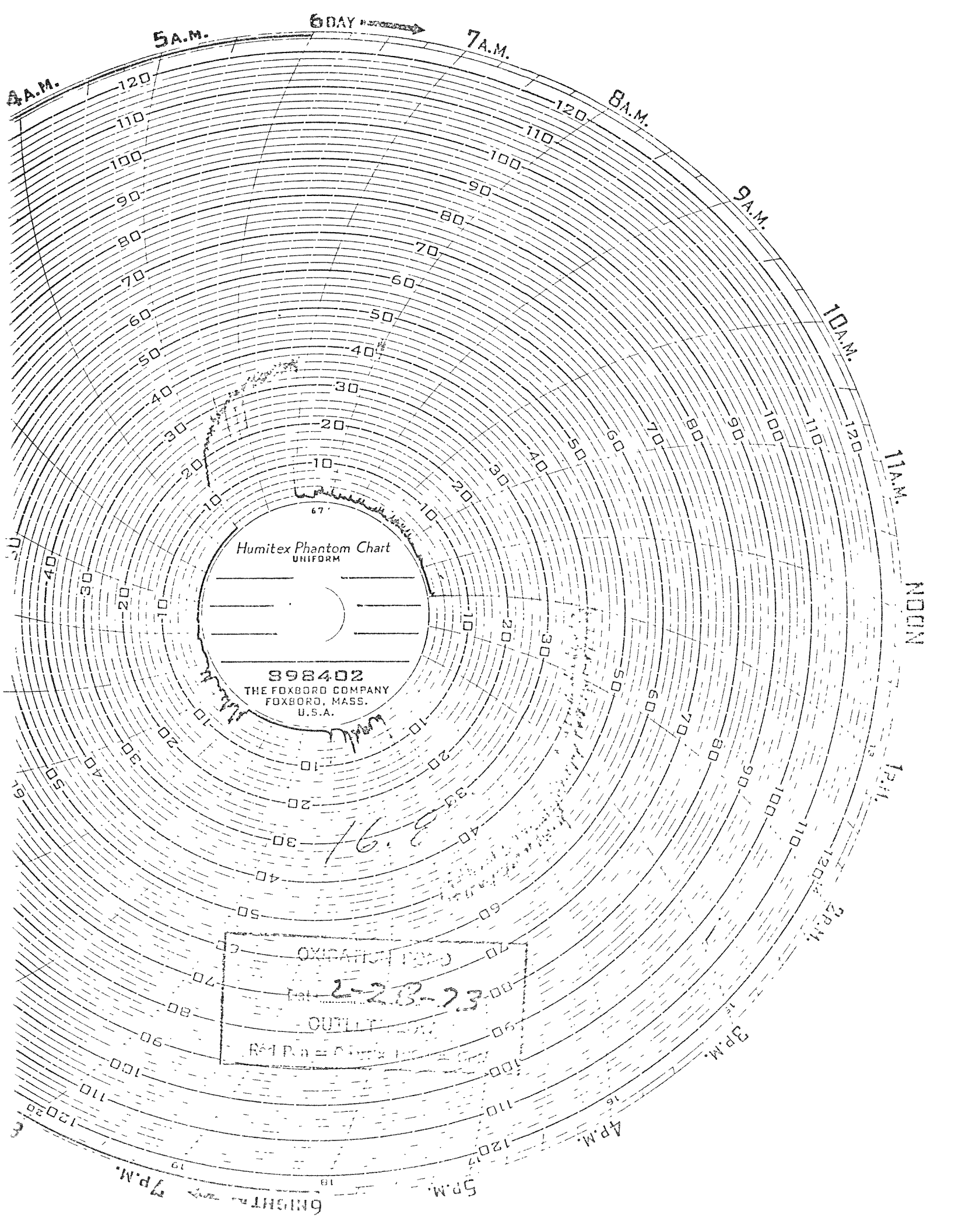
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
MIDNIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 DAY
7 A.M.
4 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
OXIDATION POND
2-26-73

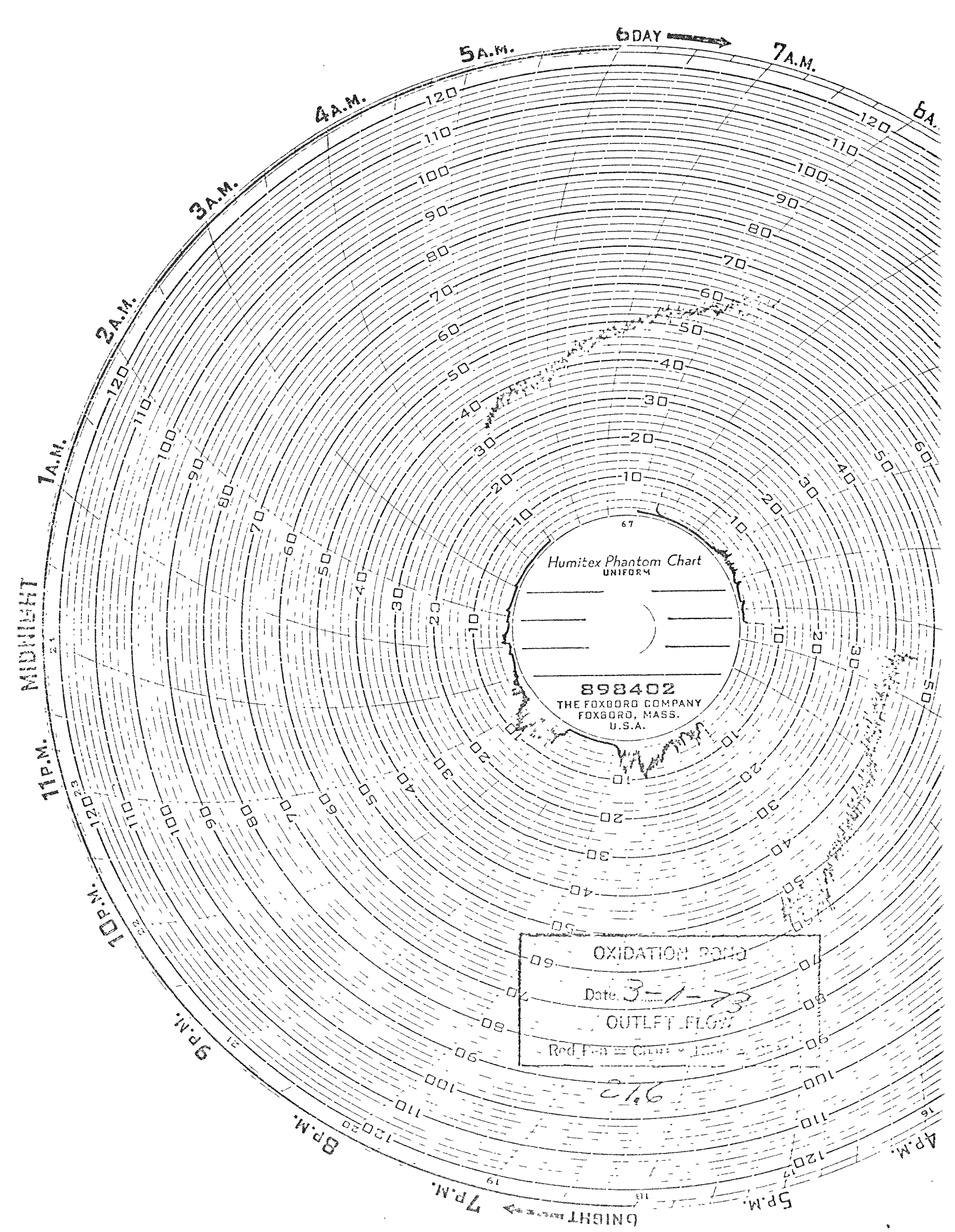

6 DAY
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
7 P.M.
8 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS
U.S.A.
OXIDATION POND
Date 2-26-73
Red Pen =

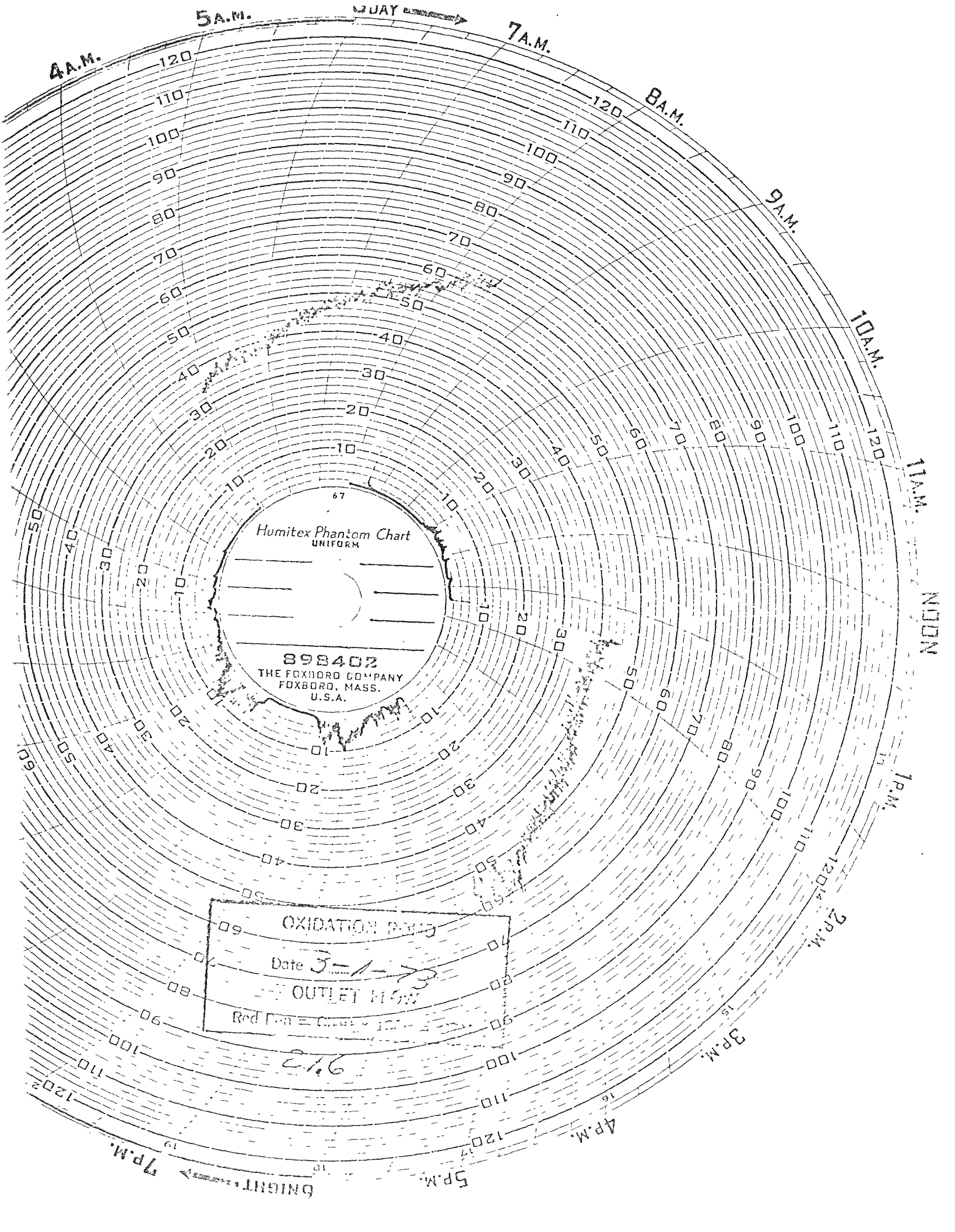

Humitex Phantom Chart
UNIFORM
89402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
DAY
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
NIGHT
4 A.M.
Date 2-27-73
21.5 M2


DAY
MIDNIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
7 A.M.
4 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
OXIDATION POND
Date 2-27-73
OUTLET FLOW
Red Pen = Chart Rotation
21.5


Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
OXIDATION POND
OUTLET FLOW
Red Pen = Outside Temp
MIDNIGHT
1A.M.
2A.M.
3A.M.
4A.M.
5A.M.
6DAY
7A.M.
8A.M.
9A.M.
10A.M.
11A.M.
4P.M.
5P.M.
7P.M.
8P.M.
9P.M.
10P.M.
11P.M.


6 DAY
5 A.M.
7 A.M.
4 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 NIGHT
7 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
67°
Date 2-28-23


DAY
5 A.M.
6 A.M.
7 A.M.
4 A.M.
3 A.M.
2 A.M.
7 A.M.
MIDNIGHT
11 P.M.
10 P.M.
9 P.M.
8 P.M.
7 P.M.
NIGHT
5 P.M.
4 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
OXIDATION POND
Date 3-1-73
OUTLET FLOW
Red Pen = Chart
216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5A.M.
DAY
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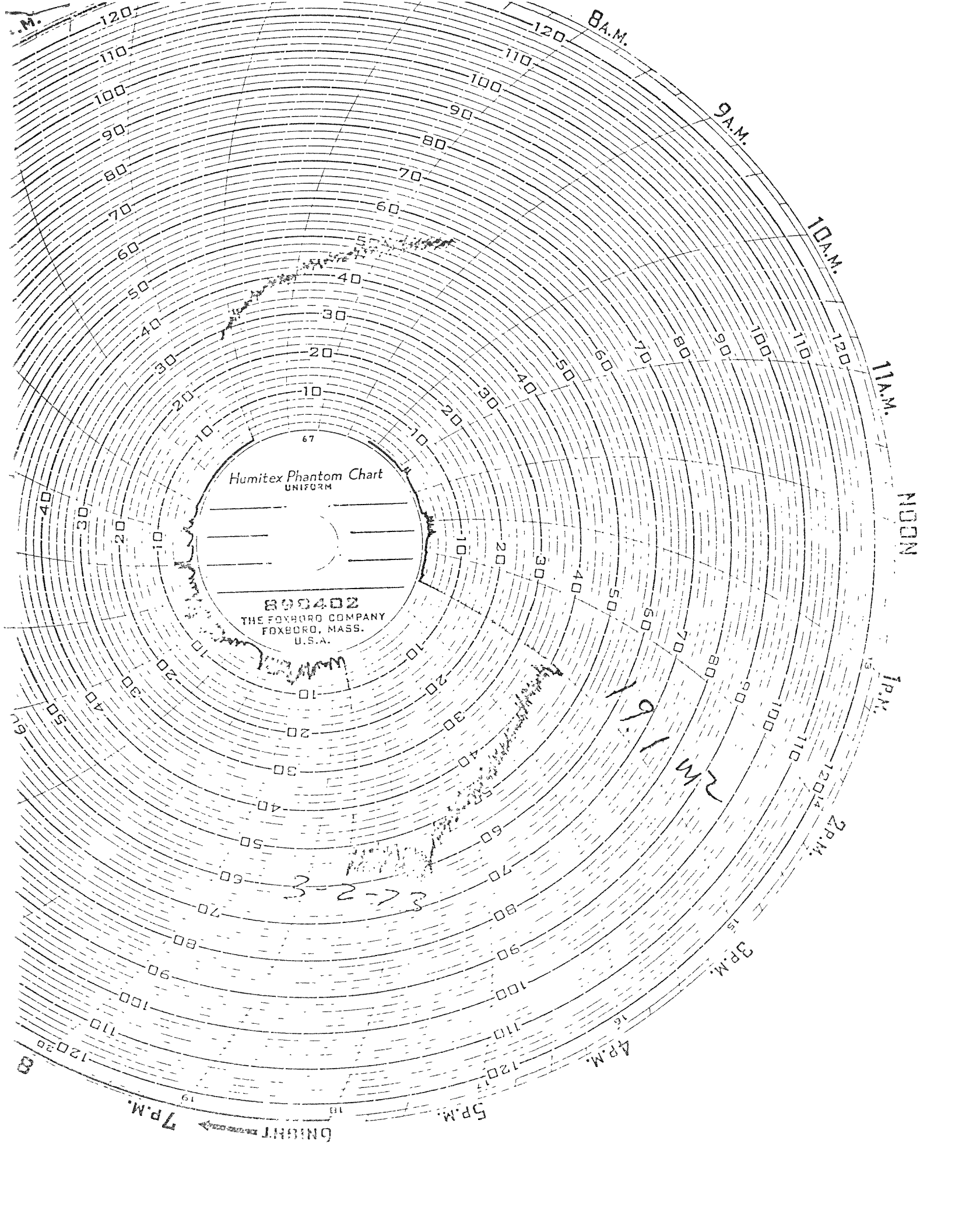
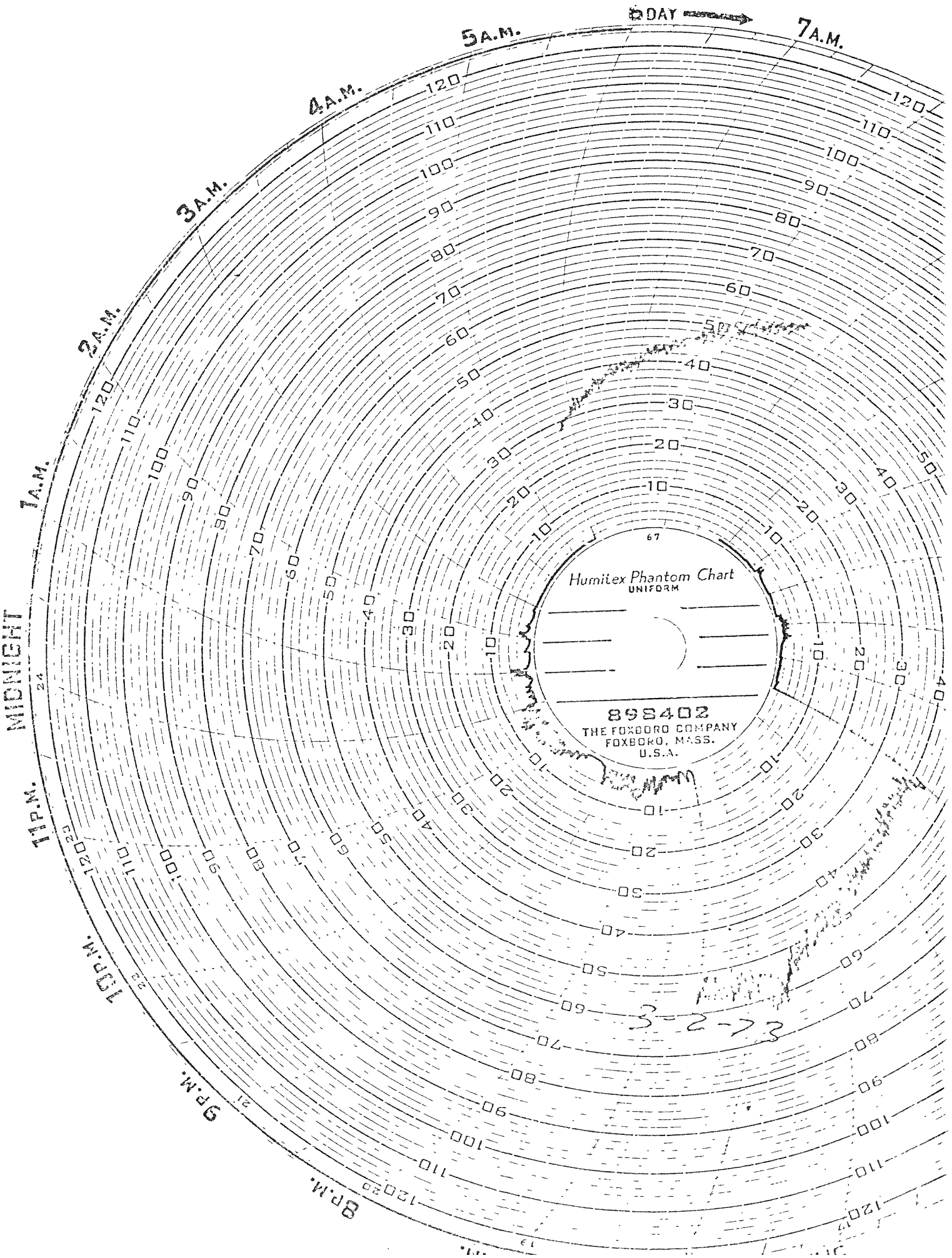
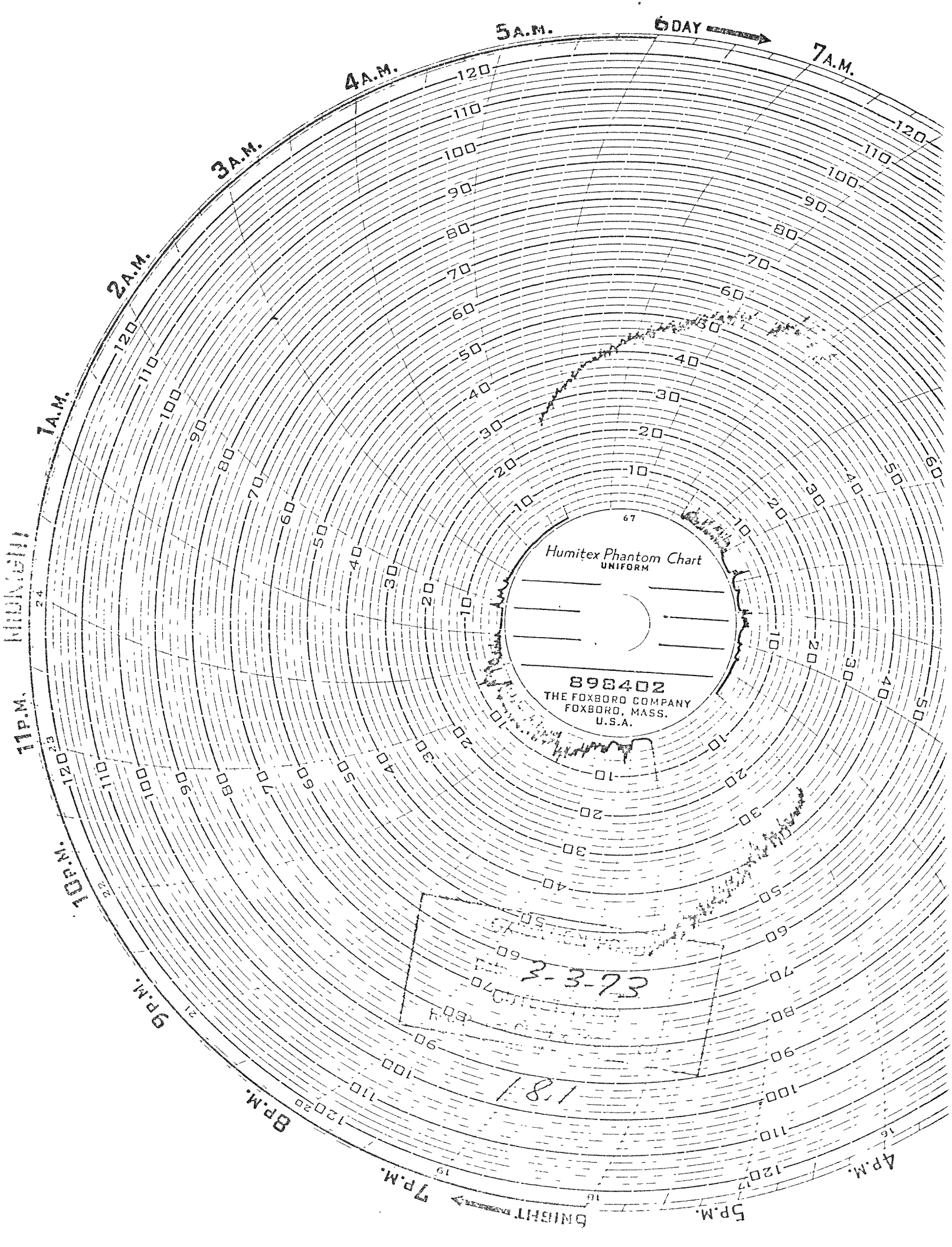
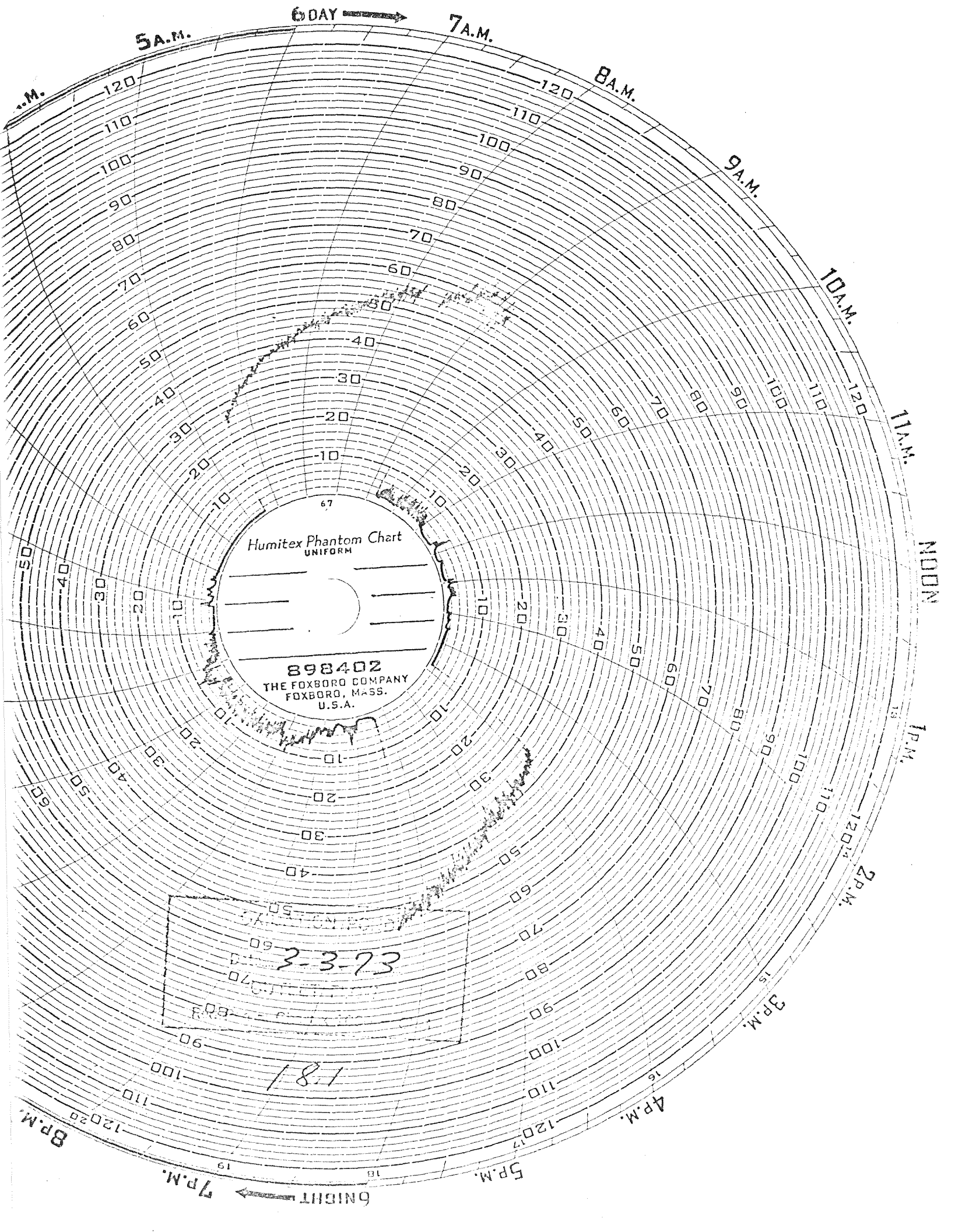
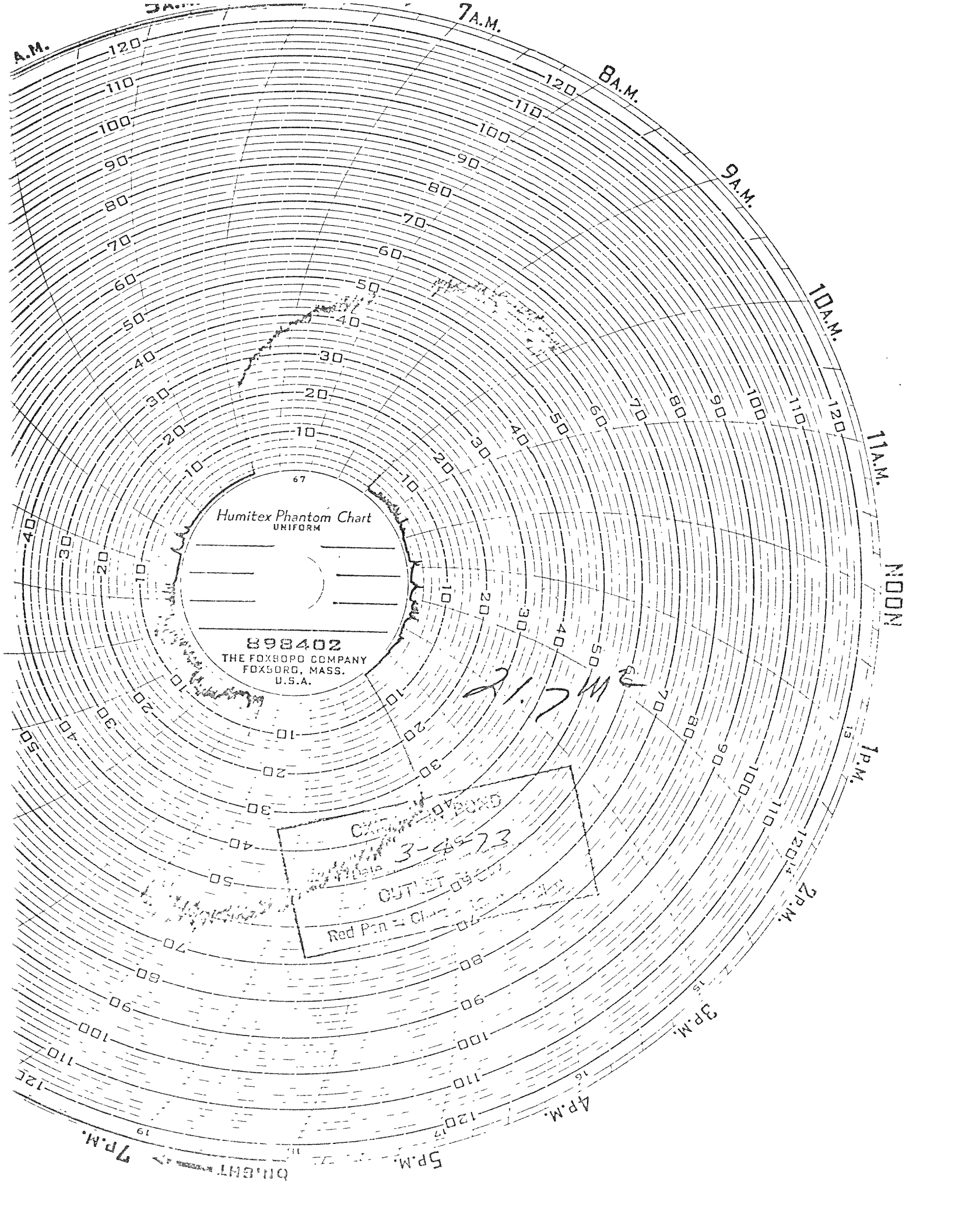
9A.M.
10A.M.
11A.M.
NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
NIGHT
7P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
OXIDATION
Date 3-1-
OUTLET
2.16

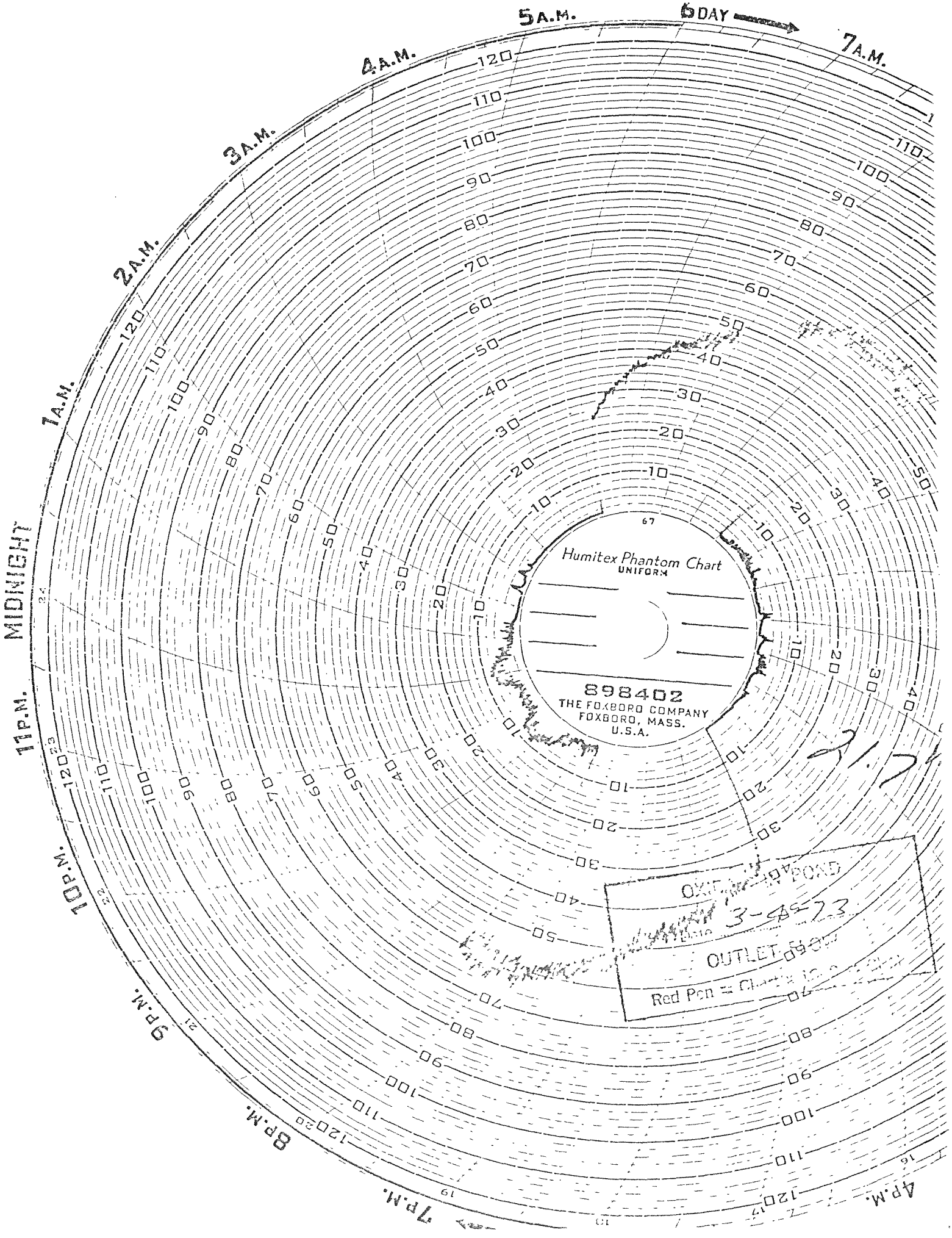

8A.M.
9A.M.
10A.M.
11A.M.
NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
7P.M.
Humitex Phantom Chart
UNIFORM
809402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

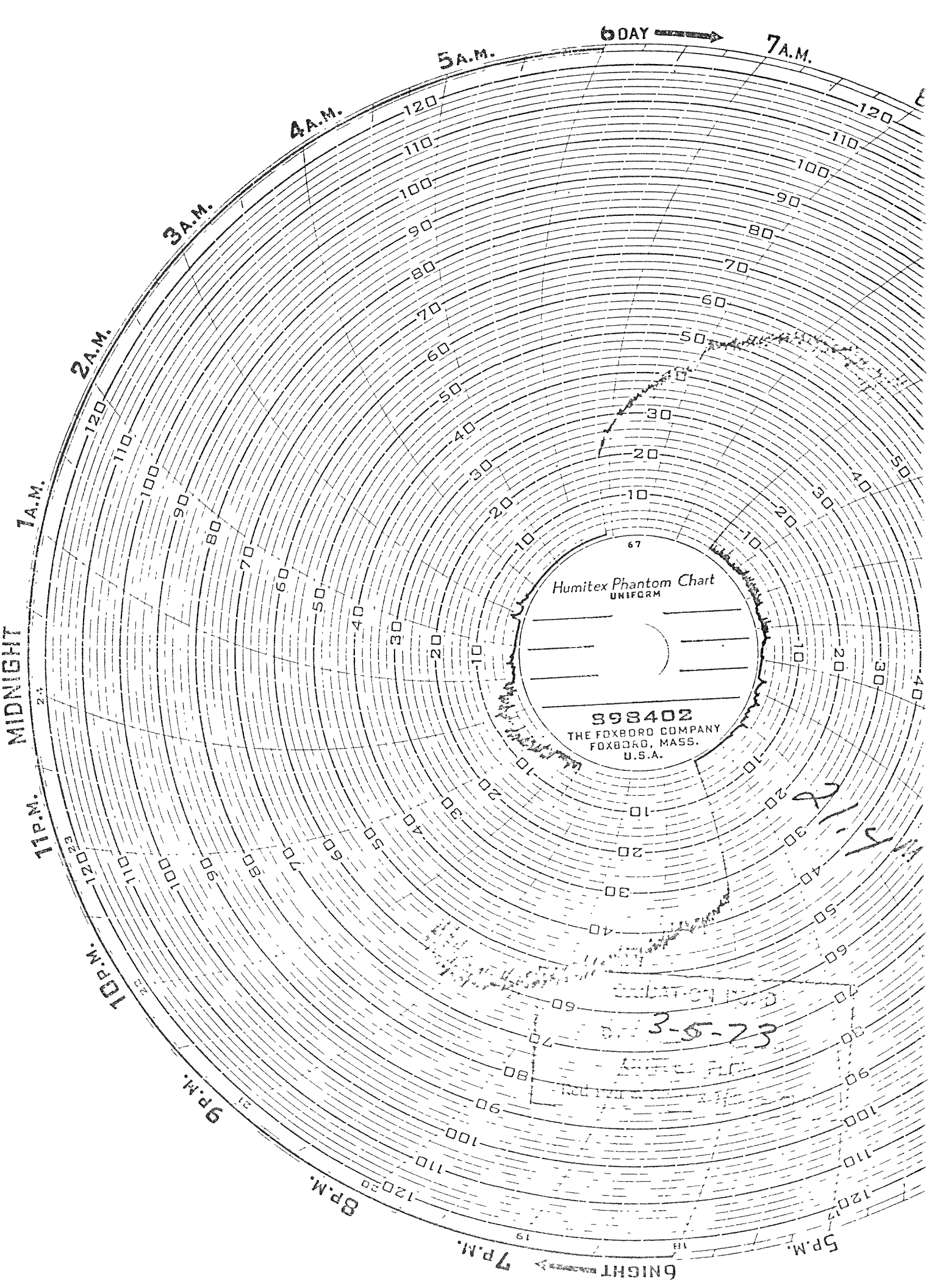

DAY
5A.M.
7A.M.
4A.M.
3A.M.
2A.M.
1A.M.
MIDNIGHT
11P.M.
10P.M.
9P.M.
8P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

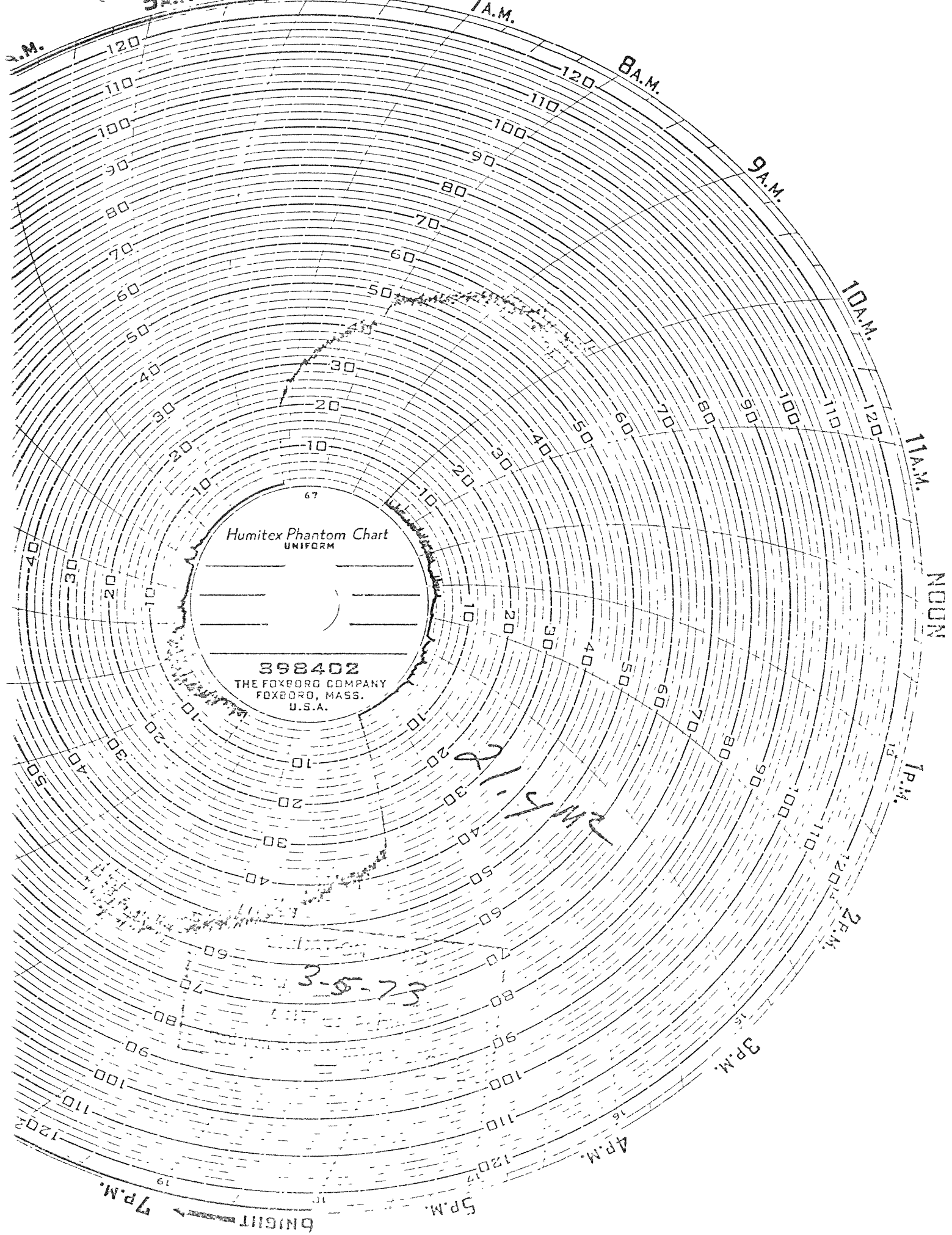

6 DAY
5 A.M.
7 A.M.
4 A.M.
3 A.M.
2 A.M.
1 A.M.
12 MIDNIGHT
11 P.M.
10 P.M.
9 P.M.
8 P.M.
7 P.M.
6 NIGHT
5 P.M.
4 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
3-3-23


6 DAY
5 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 NIGHT
7 P.M.
8 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
3-3-73
187


Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
7A.M.
8A.M.
9A.M.
10A.M.
11A.M.
NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
7P.M.


5A.M.
6 DAY
7A.M.
4A.M.
3A.M.
2A.M.
1A.M.
MIDNIGHT
11P.M.
10P.M.
9P.M.
8P.M.
7P.M.
4P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
OUTLET
Red Pen = Chart


6 DAY
7 A.M.
5 A.M.
4 A.M.
3 A.M.
2 A.M.
1 A.M.
MIDNIGHT
11 P.M.
10 P.M.
9 P.M.
8 P.M.
7 P.M.
6 NIGHT
5 P.M.
Humitex Phantom Chart
UNIFORM
S98402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.


Humitex Phantom Chart
UNIFORM
398402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 P.M.
1 A.M.
2 A.M.
3 A.M.
4 A.M.
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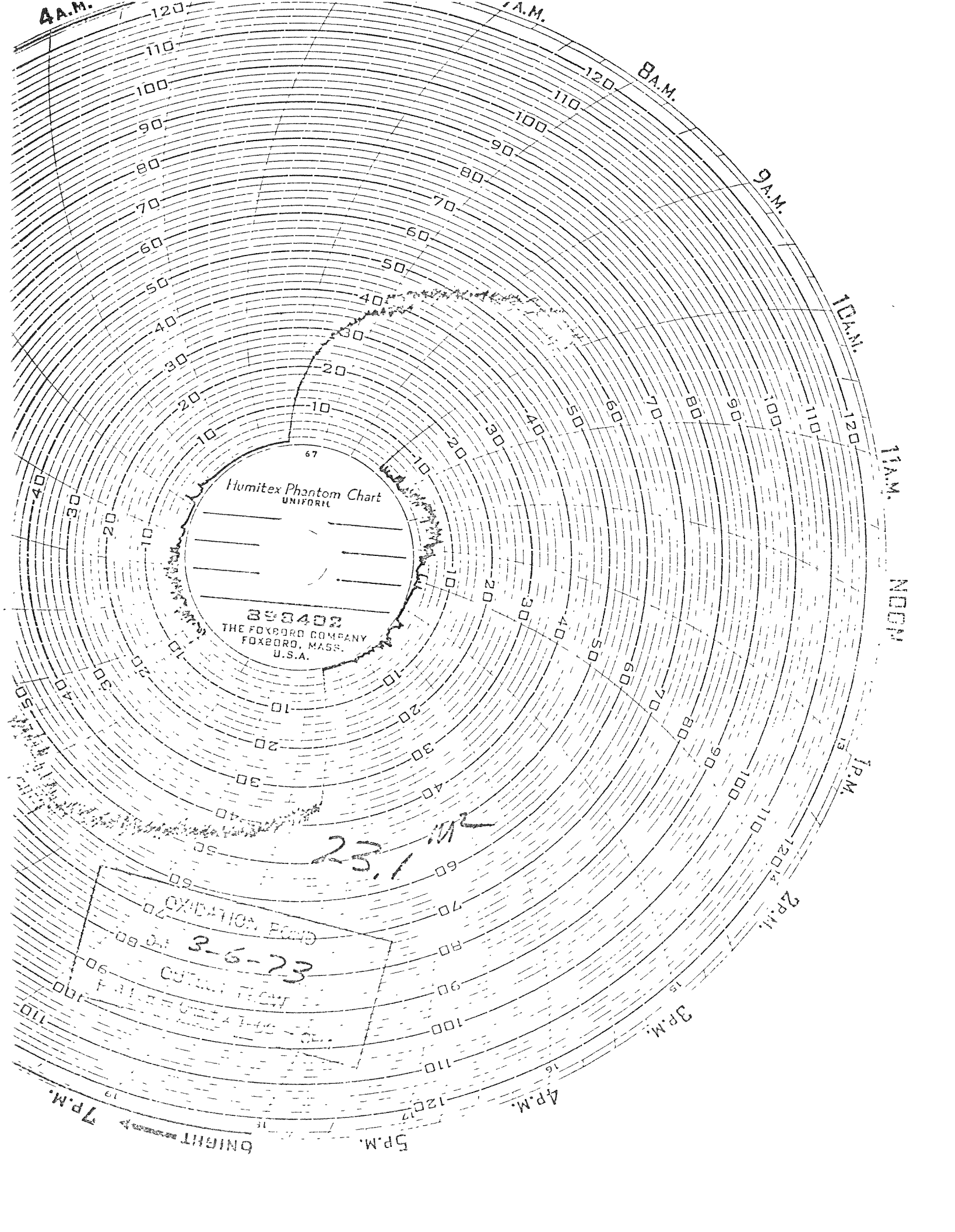
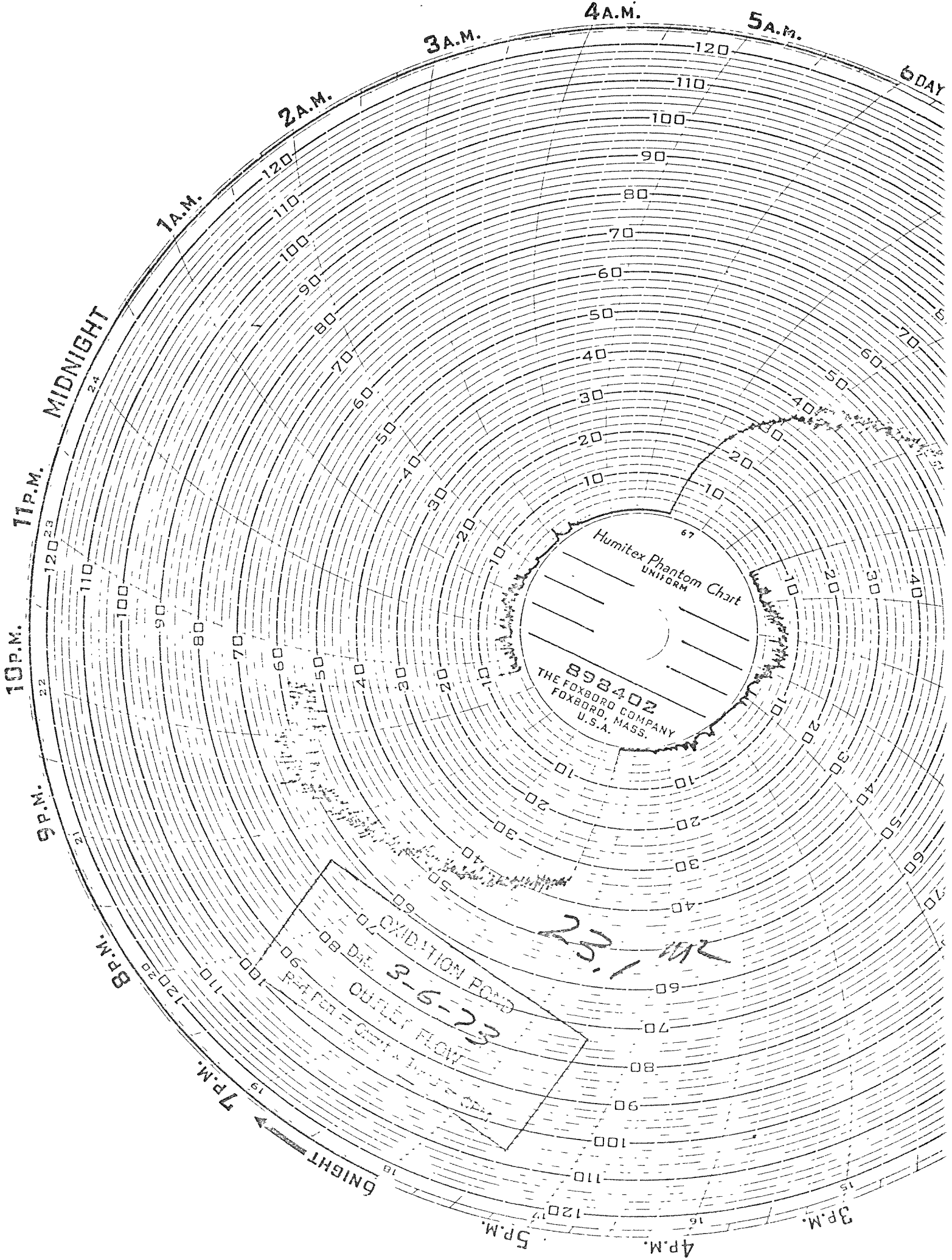
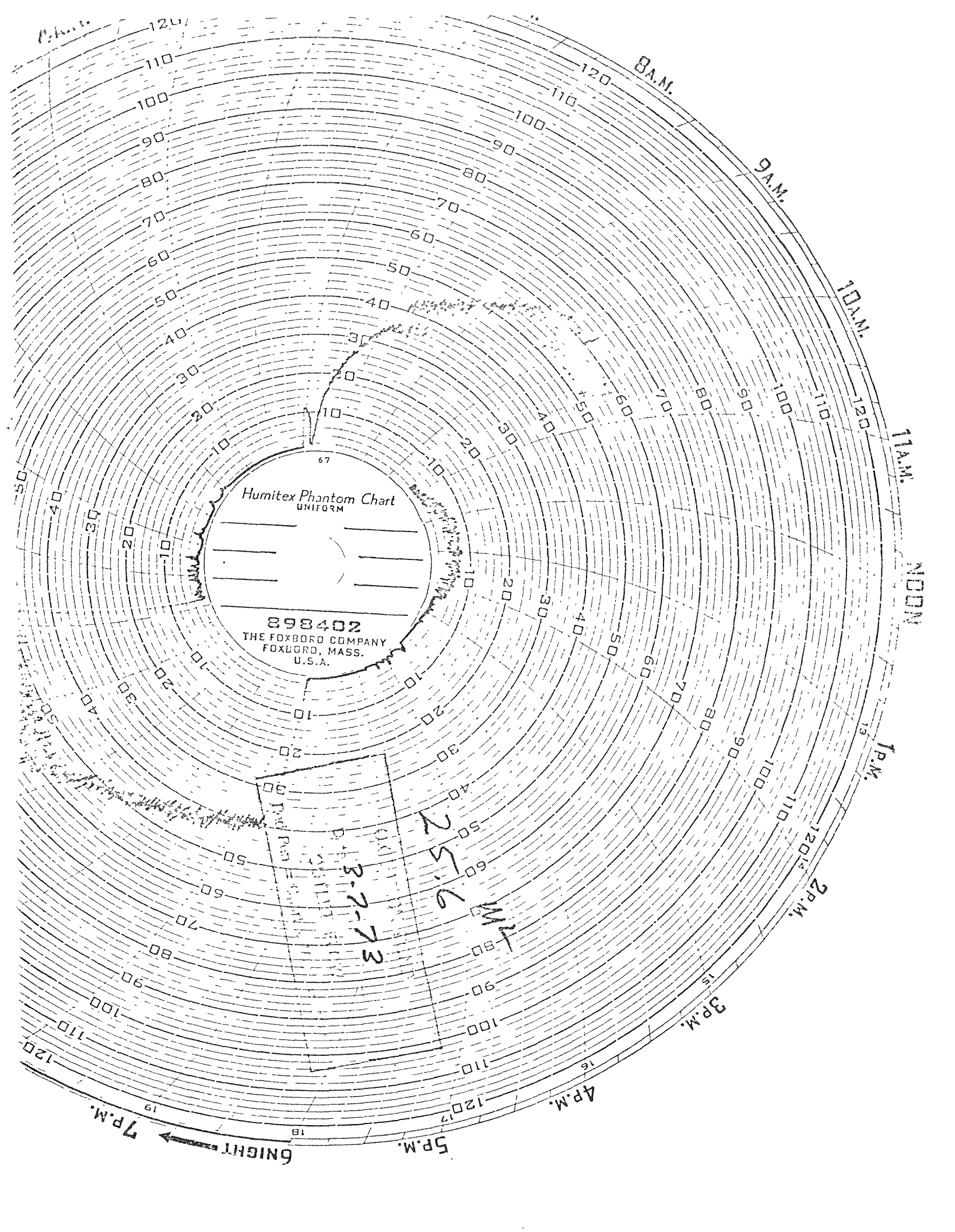
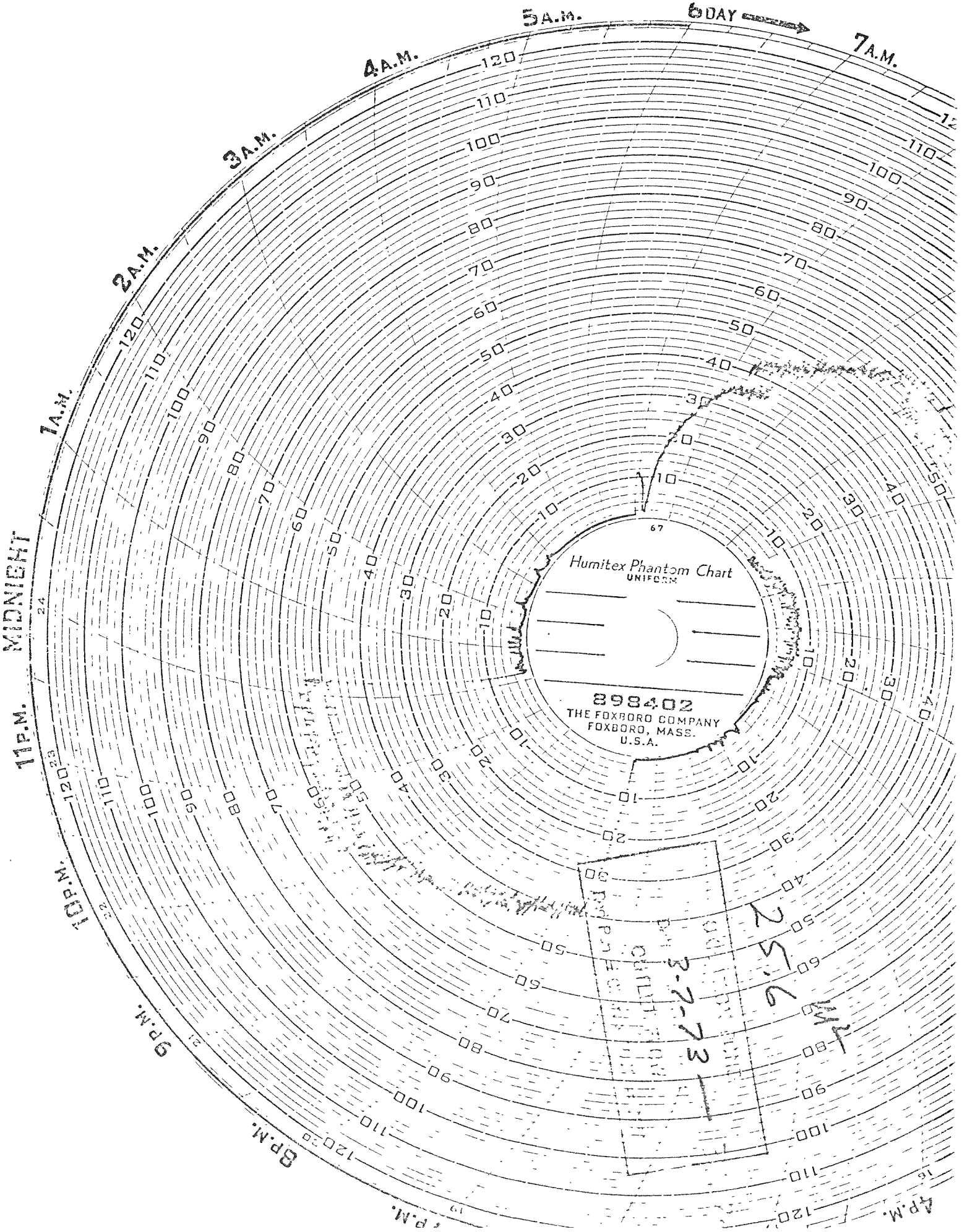
8 A.M.
9 A.M.
10 A.M.
11 A.M.
3-5-73

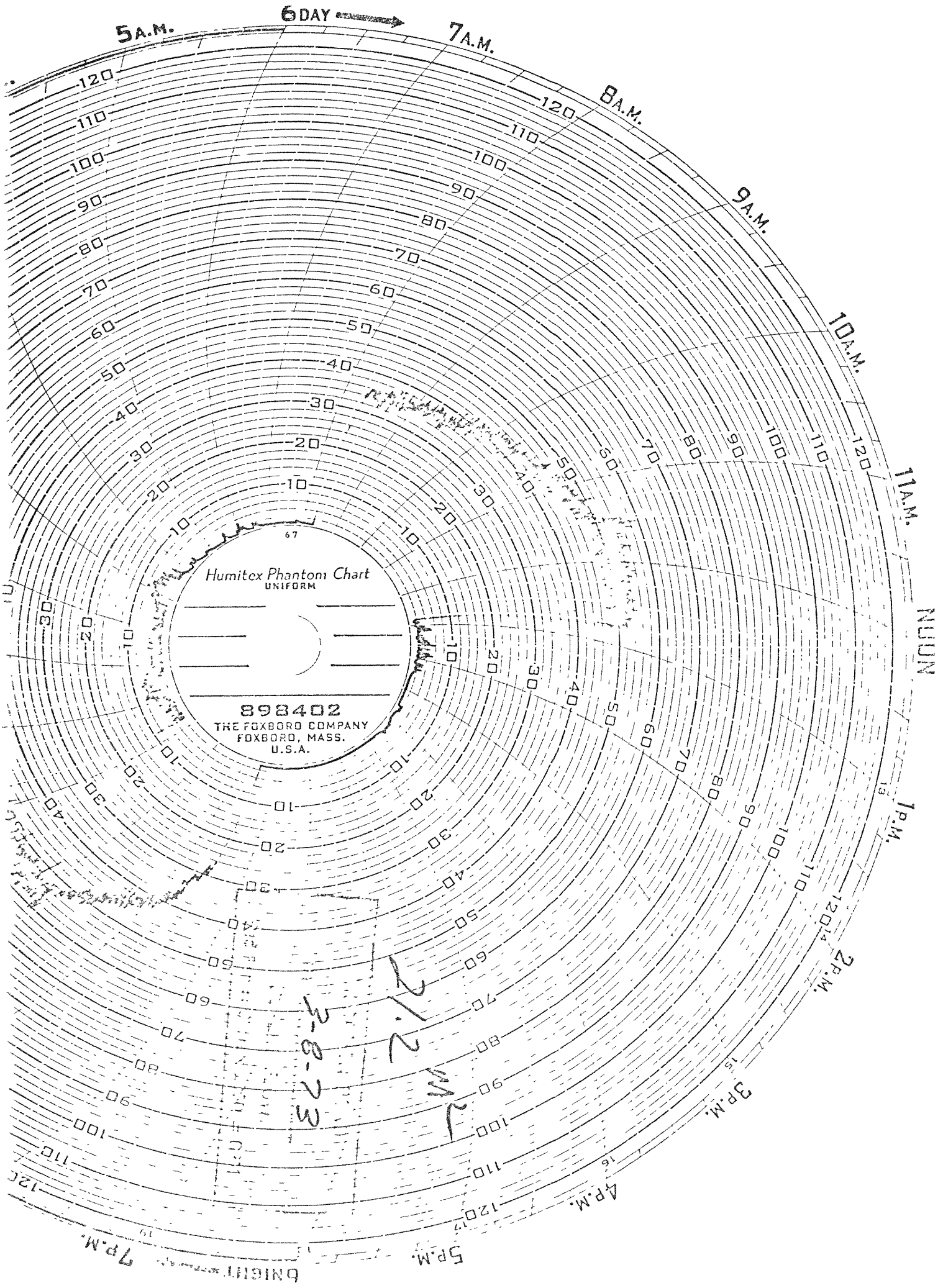

4A.M.
8A.M.
9A.M.
10A.M.
11A.M.
NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
6 NIGHT
7P.M.
Humitex Phantom Chart
UNIFORM
89402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
23.1 MR
OXIDATION BOND
3-6-23


Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
MIDNIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
6 DAY
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
OXIDATION POND
OUTLET FLOW
3-6-23


Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
8A.M.
9A.M.
10A.M.
11A.M.
NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
6NIGHT
7P.M.


MIDNIGHT
1A.M.
2A.M.
3A.M.
4A.M.
5A.M.
6 DAY
7A.M.
8A.M.
9A.M.
10A.M.
11A.M.
12 NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
6P.M.
7P.M.
8P.M.
9P.M.
10P.M.
11P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.
MIDNIGHT
1A.M.
2A.M.
3A.M.
4A.M.
5A.M.
6DAY
7A.M.
11P.M.
10P.M.
9P.M.
8P.M.
7P.M.
6NIGHT
5P.M.
4P.M.


6 DAY
5 A.M.
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
7 P.M.
Humitex Phantom Chart
UNIFORM
898402
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

State of Washington Department of Ecology

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

DATA SUMMARY

ORIGINAL TO: J. Fandrich
COPIES TO: R. DeWitt
LAB FILES

Source Weyerhaeuser @ Everett

Collected By

Date Collected Feb & March 1973

Goal, Pro./Obj.

NUMBERS Above Log # Are The Date Collected

Log No.	Station	COD	Log No.	Station	COD	Log No.	Station	COD	pH	Sp Cond. Color (Turbidity)	PBI
2-20,21 73-774	DeWitt 0748 INF	326.	2-26,27 -861	Theirs INF	618	3-3,4 -916	Theirs EFF	340			
2-20,21 775	Howard 0905 EFF	326.	2-26,27 -862	Their EFF	307	3-3,4 917	Ours INF	745			
2-22,23 816	Theirs INF	634	2-26,27 863	Our INF	- *	3-4,5 923	Our INF	594			
2-22,23 817	Theirs EFF	348	2-26,27 864	Our EFF	- *	3-4,5 924	Their INF	649			
2-22,23 818	Ours INF	554	2-27,28 899	Theirs INF	- *	3-4,5 925	Our EFF	364			
2-22,23 819	Ours EFF	331	2-27,28 900	Theirs EFF	- *	3-5,6 950	Theirs INF	594			
2-24 820	Theirs INF	583	2-27,28 901	Ours INF	784	3-5,6 951	Theirs EFF	388			
2-24 821	Theirs EFF	339	2-27,28 902	Ours EFF	303	3-5,6 952	Ours INF	602			
2-24 822	Ours INF	583	2-28 903	Their INF	- *	3-5,6 953	Ours EFF	380			
2-24 823	Ours EFF	331	2-28 904	Their EFF	- *	3-6,7 968	Theirs INF	615			
2-25 824	Theirs INF	552	2-28 905	Our INF	- *	3-6,7 969	Theirs EFF	386			
2-25 825	Theirs EFF	333	2-28 906	Our EFF	- *	3-6,7 970	Ours INF	615			
2-25 826	Ours INF	586	3-1 907	Theirs INF	831	3-6,7 971	Ours EFF	378			
2-25 827	Ours EFF	349	3-1 908	Theirs EF	318	3-7,8 975	Our INF	863			
2-21,22 839	Ours INF	689	3-1 909	Ours INF	800	3-7,8 976	Our EFF	376	7.1	3790. 2400	420.
2-21,22 840	Theirs INF	689	3-1 910	Ours EFF	303	3-7,8 978	Their EFF	376			
2-21,22 841	Theirs EFF	317	3-2,3 911	Theirs INF	746	3-8,9 997	Theirs INF	792			
2-25,26 844	Theirs INF	481	3-2,3 912	Theirs EFF	326	3-8,9 998	Theirs EFF	337			
2-25,26 845	Theirs EFF	315	3-2,3 913	Ours INF	746	3-8,9 999	Ours INF	776			
2-25,26 846	Ours INF	528	3-2,3 914	Ours EFF	326	3-8,9 73-1000	Ours EFF	345			
2-25,26 847	Ours EFF	323	3-3,4 915	Theirs INF	776						

Note: All results are in PPM unless otherwise specified. ND is "None Detected"

Summary by Stephen P. Kobl Date 3-30-73

Pages 54 through 56 of this publication are too illegible to be viewed online. To request a printed copy of this publication, please contact the Environmental Assessment Program at the Washington State Department of Ecology.