

SCHUMBERGER

**SIDEWALL
NEUTRON POROSITY LOG**

PROVINCE YUKON TERRITORIES
 FIELD WILDCAT
 WELL INEXCO HUSKY ET AL PORCUPINE
 Y.T. G-31
 COMPANY INEXCO OIL COMPANY

PROVINCE YUKON TERRITORIES
 LOCATION 66° 21' 22" N LAT.
 140° 06' 13" W LONG.
 COMPANY INEXCO OIL COMPANY
 WELL INEXCO HUSKY ET AL PORCUPINE
 FIELD WILDCAT
 PROV. DIST. Y.T. G-31
 PERMANENT DATUM GL Rev. 3008.4
 LOG MEASUREMENT FROM KB 16 ft. Above Perm. Datum
 ELEV: KB 3025.0
 G 3008.4
 Other Settings: FDC-GR, HDT,

26 FEB 72	22 MAR 72
ONE	TWO
4885	8718
990	4900
3895	3818
4887	8720
4900	8720
990	4900
988	4900
STIFF FOAM & AIR	GEL
8.7	8.0
28.5	70
5.09	70
12 1/4"	8 3/4"
PNT-A 4 HRS OSU-C-307 STUEHMER TJEFIN	PNT-A 4 HRS OSU-C-307 REM STUEHMER TJEFIN



MAR 72 CAL PK

REMARKS
 Drilling Stopped 1200 / 24th : Circulation Stopped 2200 / 24th : Tool on Bottom 0900 / 26th : 1st Run Service Order # 7701
 B.H.T. 94

Panel No. EA 188
 Cartridge No. A 341
 Sonde No. E 555
 Detector No. A 88
 SET-116 No.
 HOLE DRILLED WITH STIFF FOAM & AIR
 SEEPING FORMATION WATER PLUS 250 BARRELS OF RIG.
 WATER FILLED HOLE TO CASING

CALIBRATION: Gamma Ray				Neutron Environmental Cal.	
Background CPS	Test Source CPS	Galv. Deflection	Sens. Tap	Drawer In-CPS	Drawer Out-CPS
30	410	10.0		Before 200	198
Panel Settings: Function Former Temp. Comp. Setting T.C.				Mud Wt./Salinity Comp. set as per recorded value	
LIMESTONE	91	2	from 4885 to 990	After	
				Neutron Auxiliary Cal. - CPS	
				Before	
				After	

This interpretation represents our best judgment. Nevertheless since all interpretations are opinions based solely on inferences from electrical or other measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation and shall not be liable or responsible for any loss, cost, damages, or expenses that may be incurred or sustained resulting from this or any other interpretation.

REMARKS RUN 2:
 Drilling Stopped 2200 / 20th : Circulation Stopped 0500 / 21st : Tool on Bottom 2200 / 21st : 1st Run Service Order # 7701
 B.H.T. 114

Panel No. EA 169
 Cartridge No. A 68
 Sonde No. E 555
 Detector No. PNHA
 SET-116 No.
 RUN 2: MUD SAMPLES: Rm #1 = 6.37 @ 69°F (0330 / 21st)
 Rm #2 = 6.29 @ 70°F (0400 / 21st)
 Rm #3 = 6.17 @ 69°F (0430 / 21st)

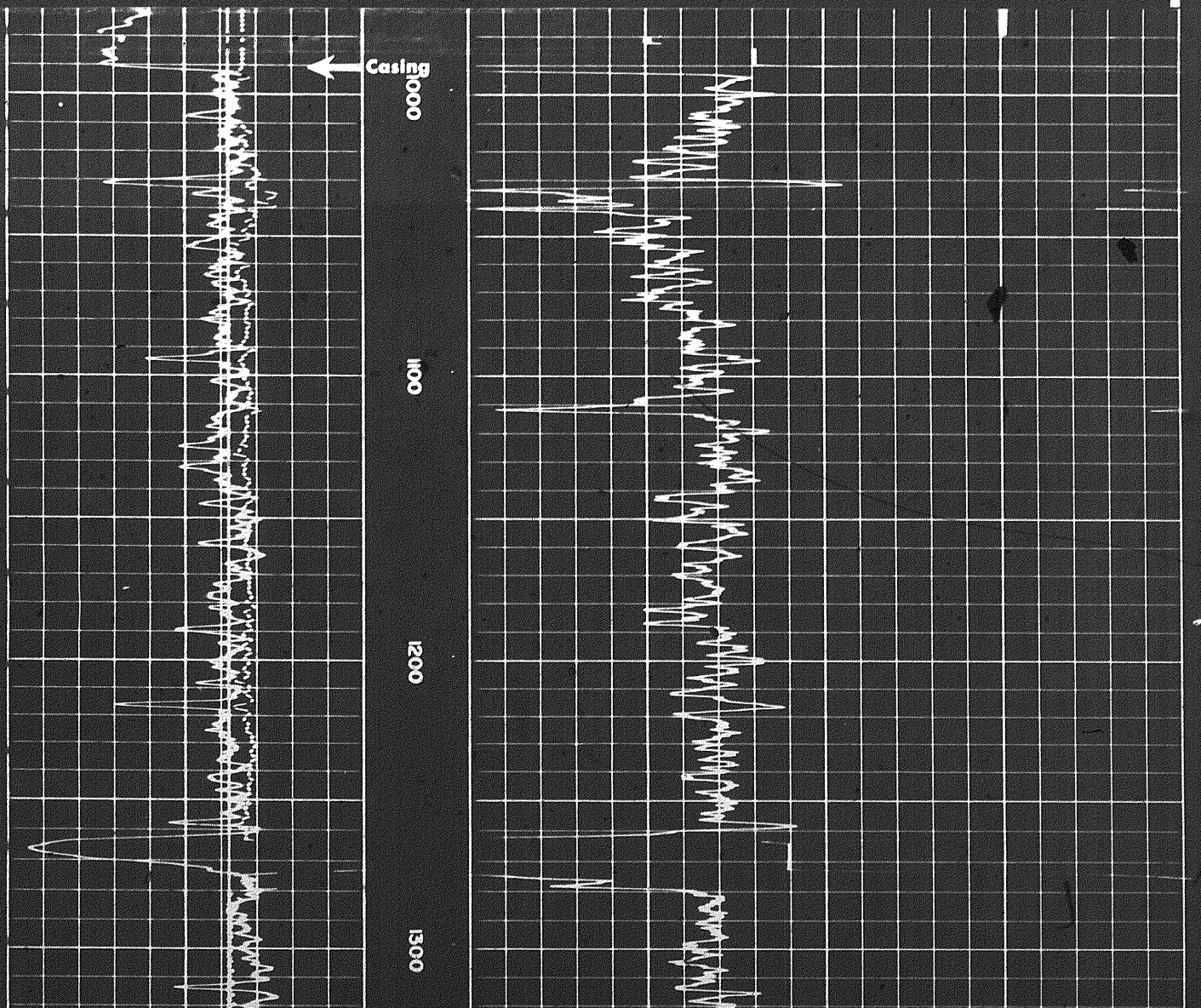
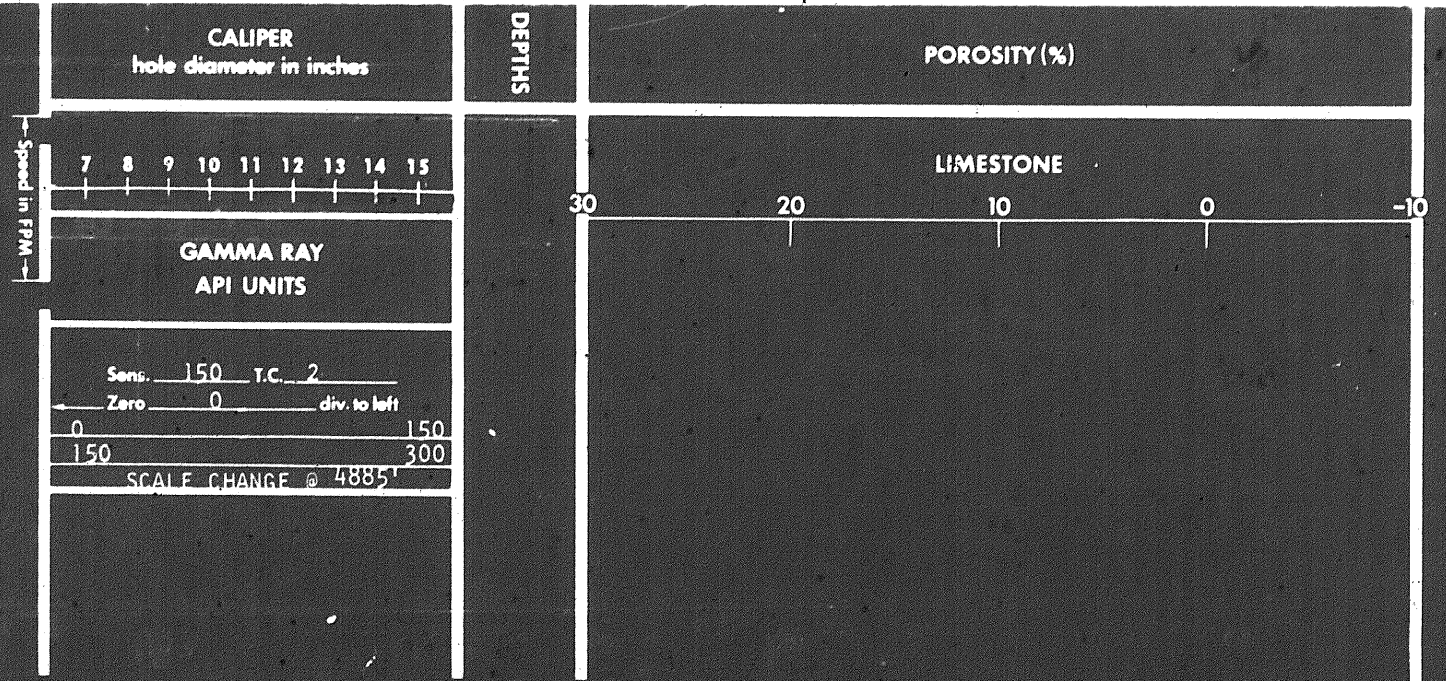
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Background CPS	Test Source CPS	Galv. Deflection	Sens. Tap	Drawer In-CPS	Drawer Out-CPS
20	420	10.0	PGP	Before	
Panel Settings: Function Former Temp. Comp. Setting T.C.				Mud Wt./Salinity Comp. set as per recorded value	
LIMESTONE	110	2	from 8718 to 4900	After	
				Neutron Auxiliary Cal. - CPS	
				Before	
				After	

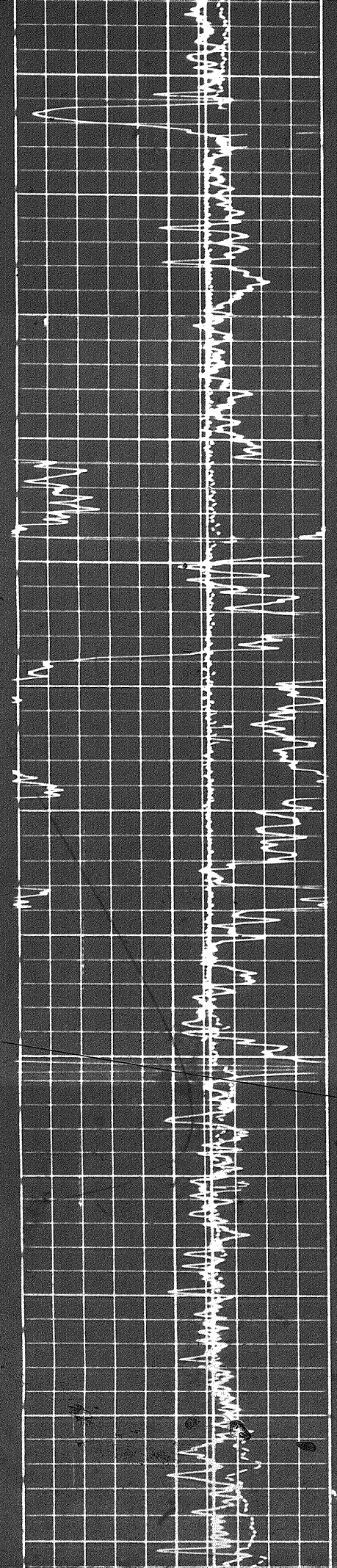
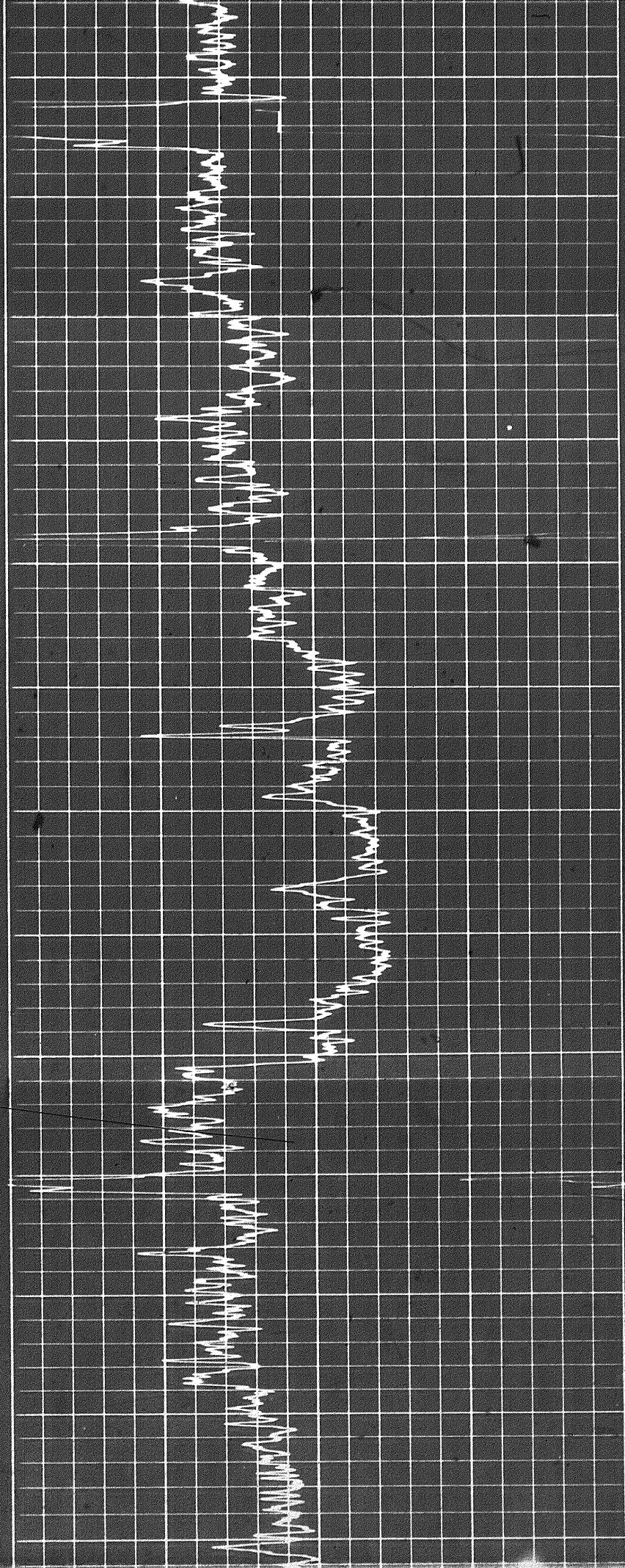
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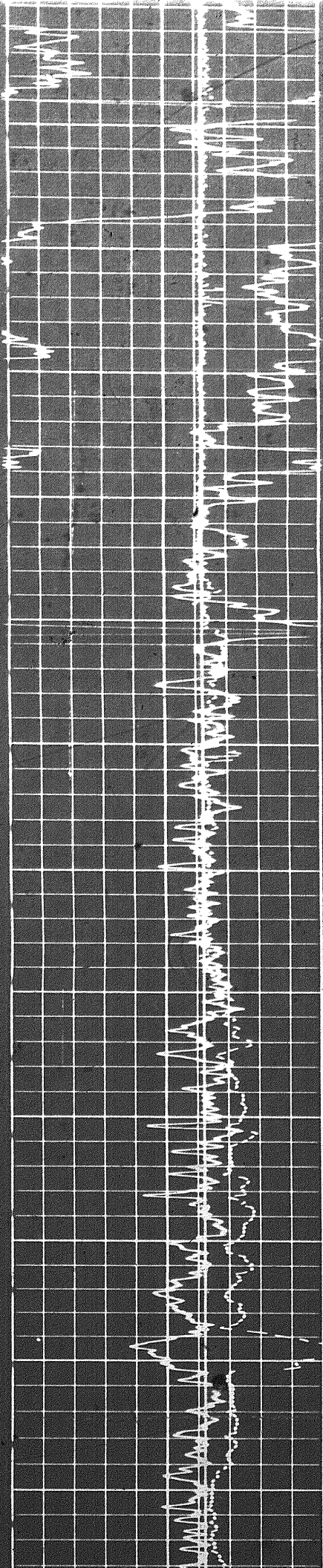
Detector No. PNHA
 SFT-116 No.

CALIBRATION: Gamma Ray				Neutron Environmental Cal.	
Background CPS	Test Source CPS	Galv. Deflection	Sens. Tap	Drawer In - CPS	Drawer Out - CPS
20	420	10.0	PGP	Before	
Panel Settings: Function Former Temp. Comp. Setting T.C.				After	
LIMESTONE	110	2	Mud Wt./Salinity Comp. set as per recorded value	Neutron Auxiliary Cal. - CPS	
			from 8718 to 4900	Before	
			from to	After	

This interpretation represents our best judgment. Nevertheless since all interpretations are opinions based solely on inferences from electrical or other measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation and shall not be liable or responsible for any loss, cost, damages, or expenses that may be incurred or sustained resulting from this or any other interpretation.







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1500

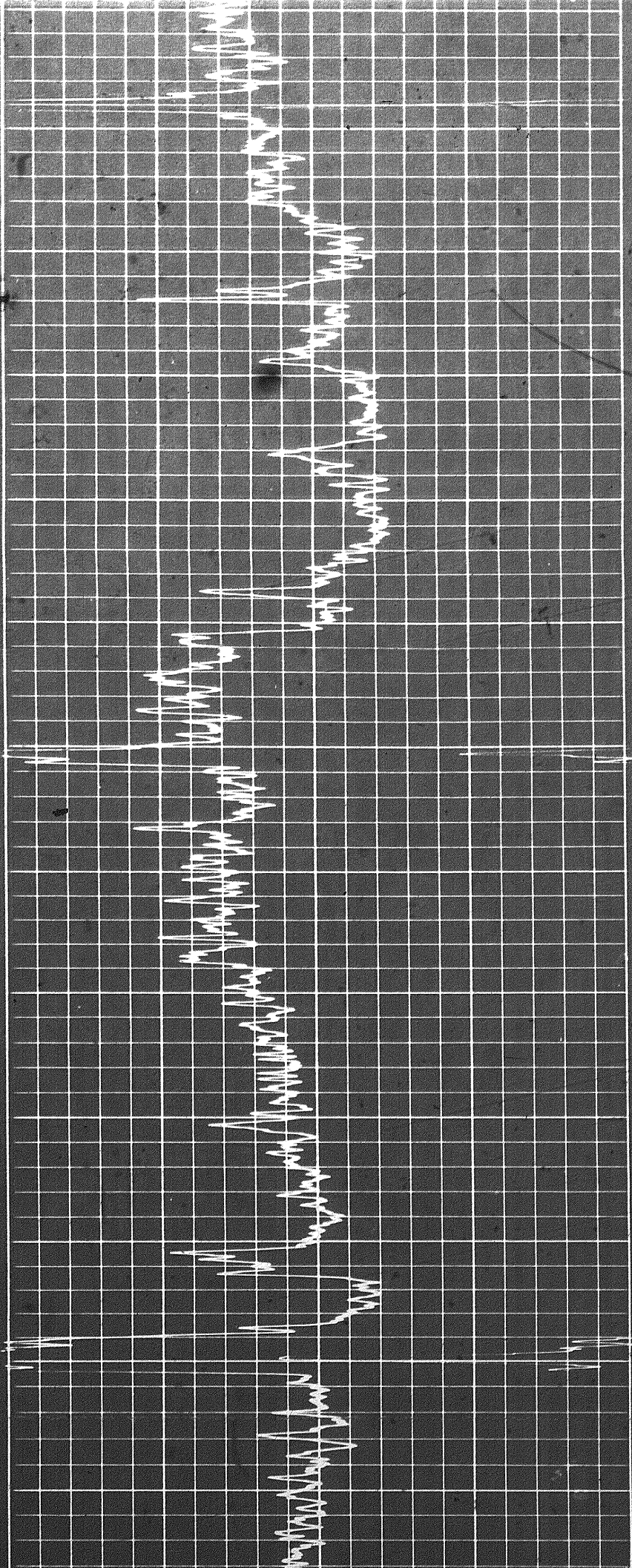
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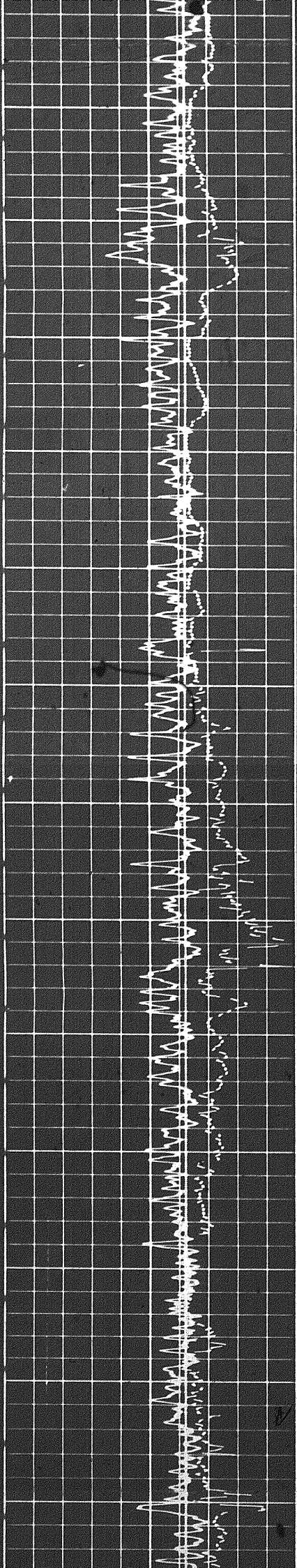
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1900

2000



982



2000

2100

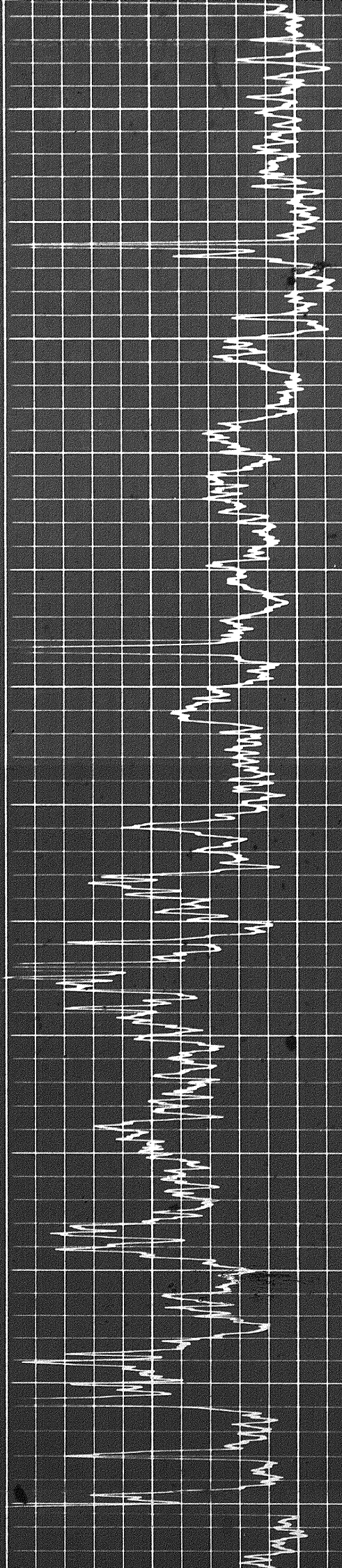
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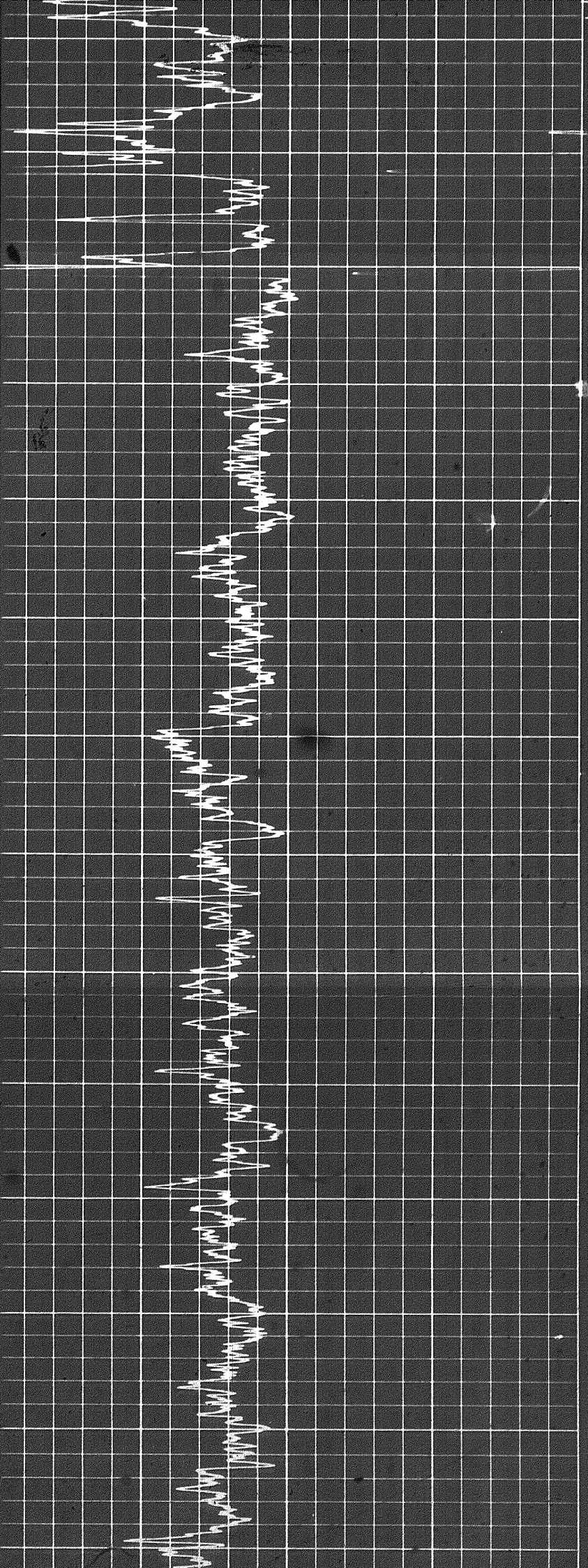
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2400

2500

2600





2500

2600

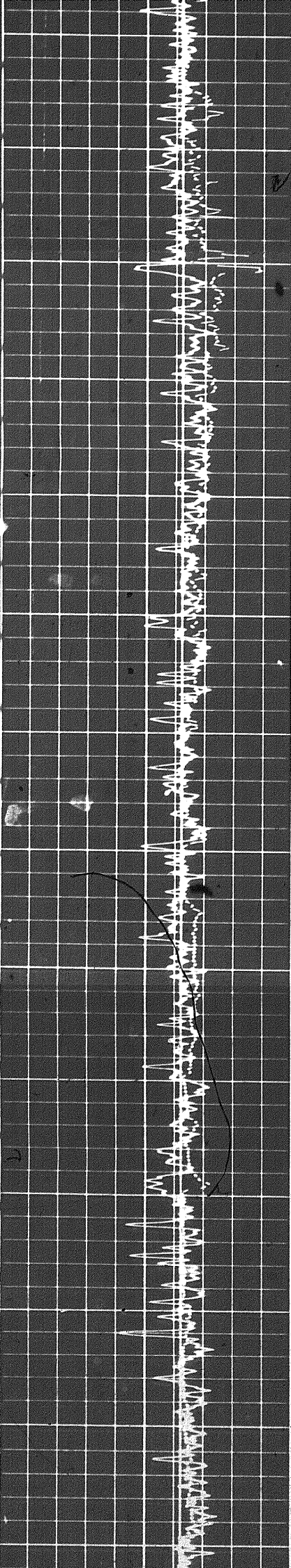
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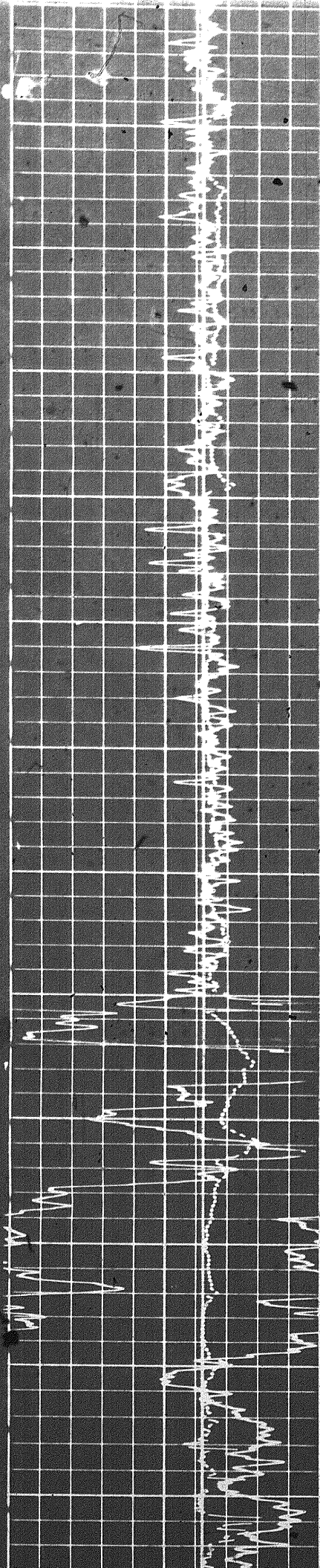
2800

2900

3000

3100





3200

3250

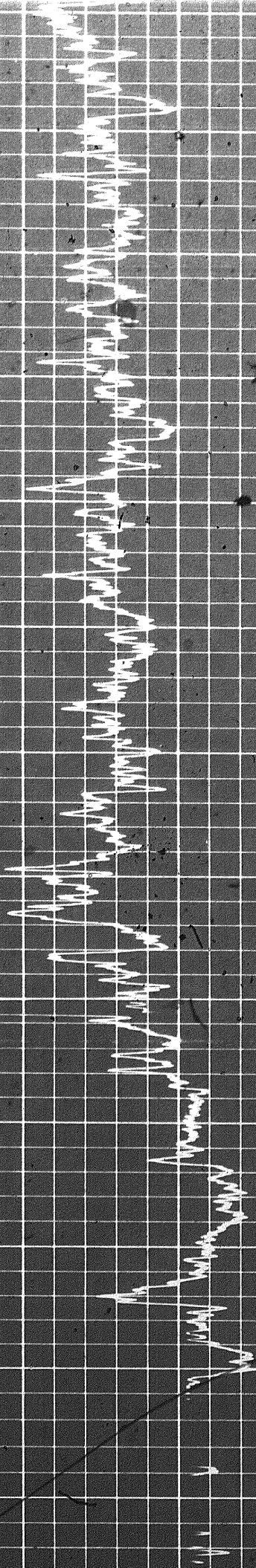
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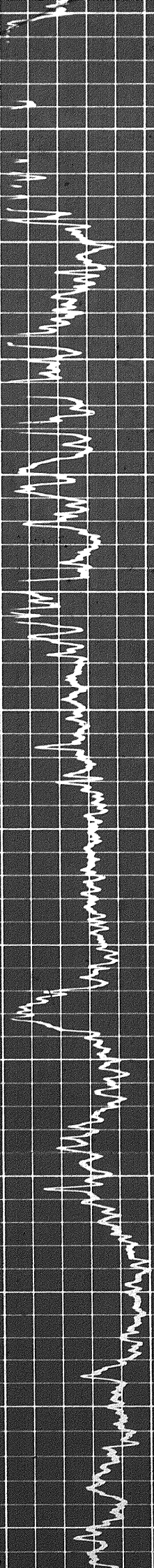
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3400

3450

3500





3400

3500

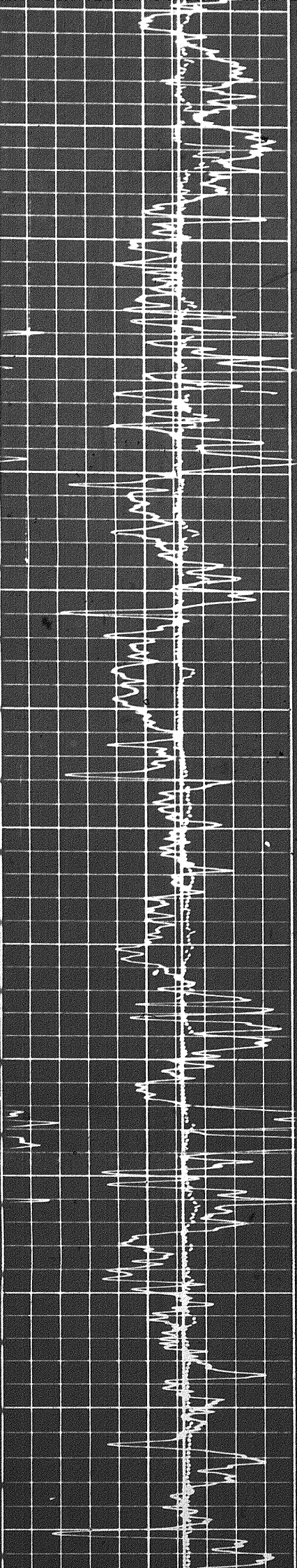
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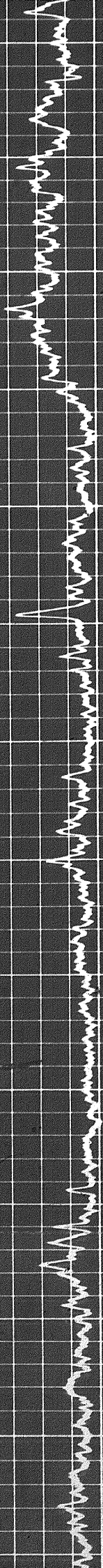
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3800

3900

4000





4000

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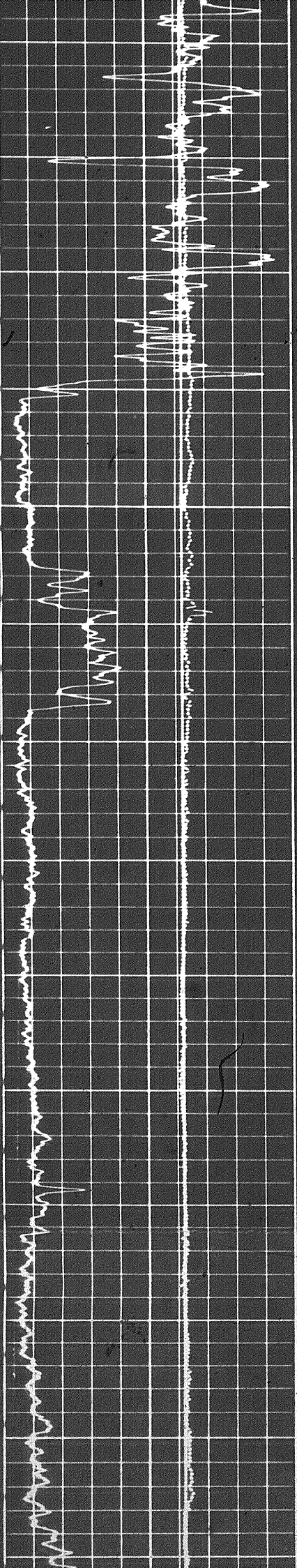
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4300

4400

4500

460



4800

4800

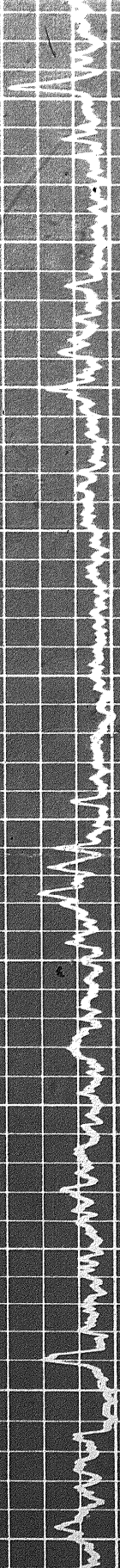
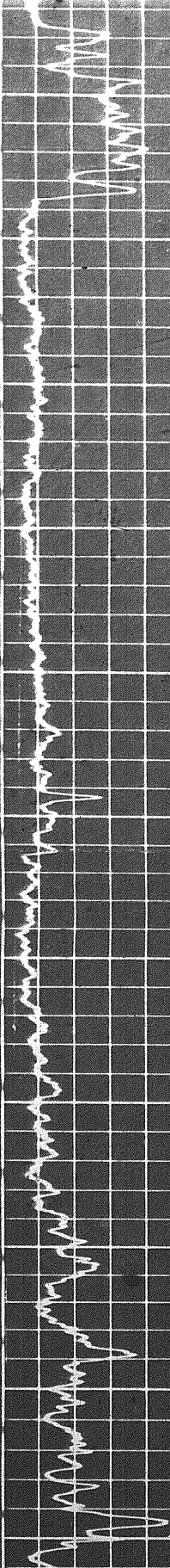
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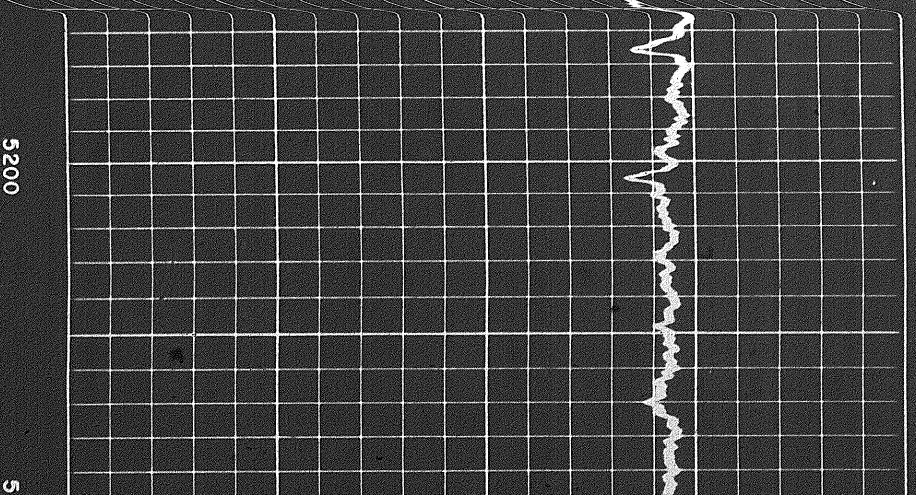
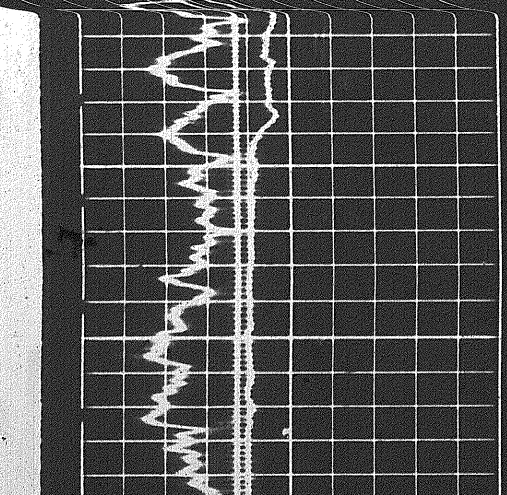
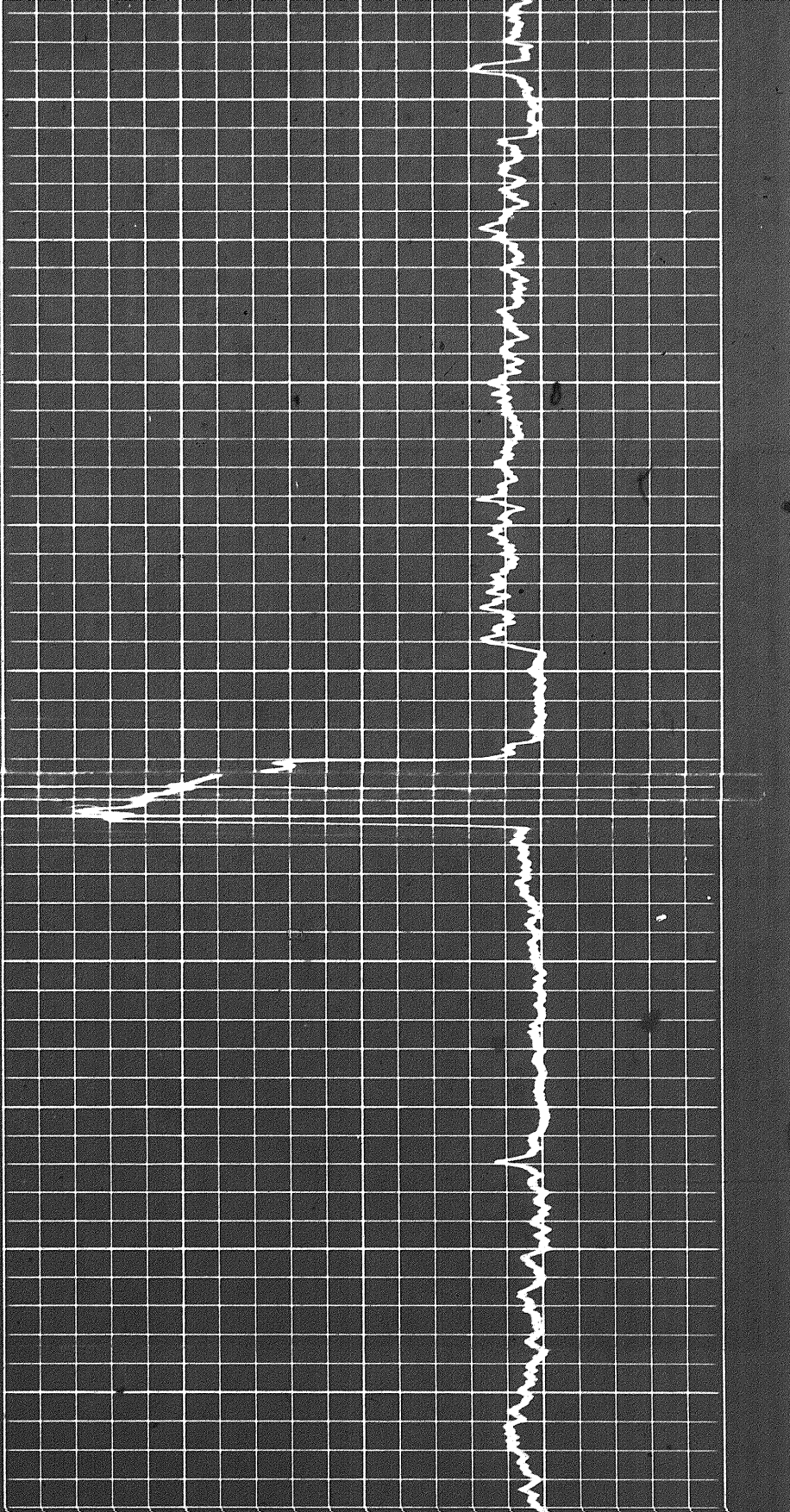
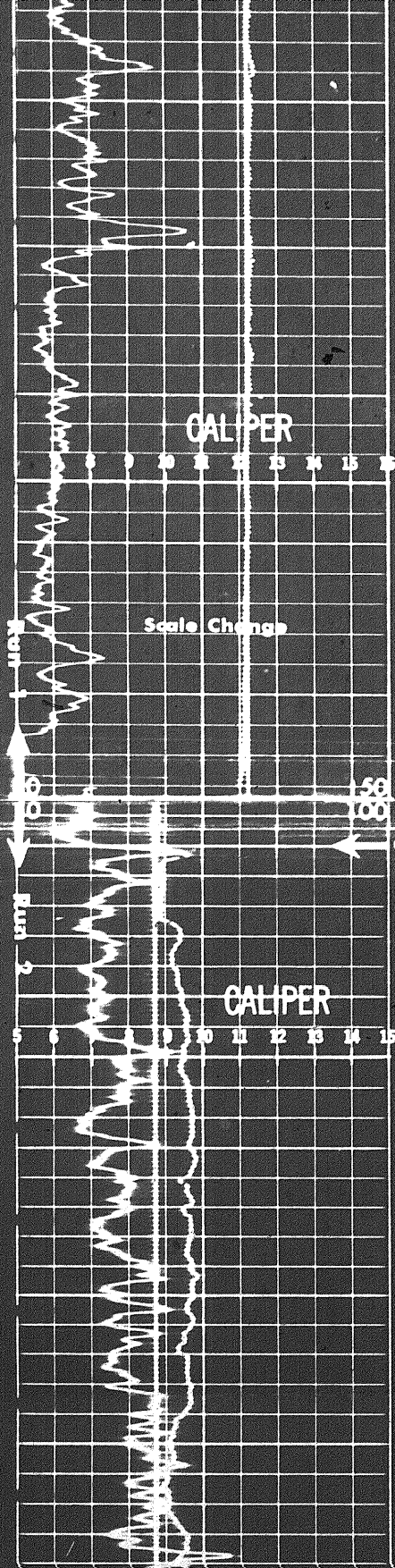
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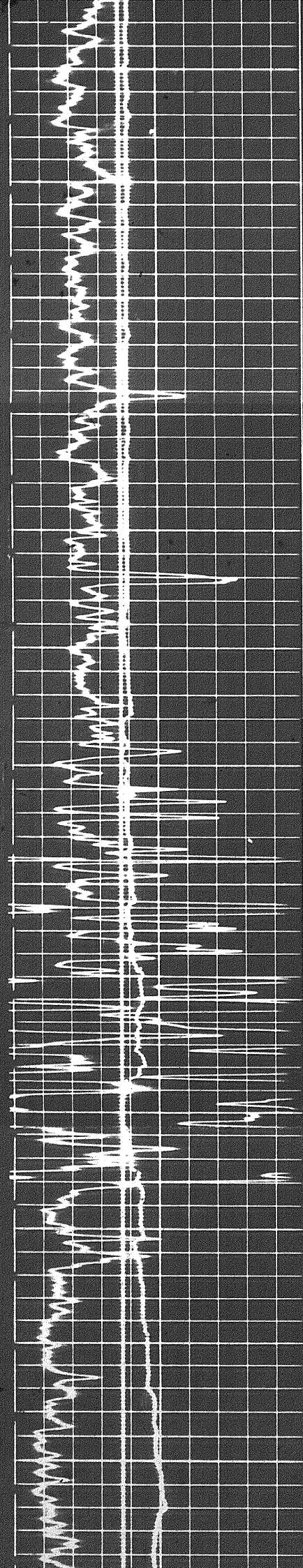
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5200

5



5300

5400

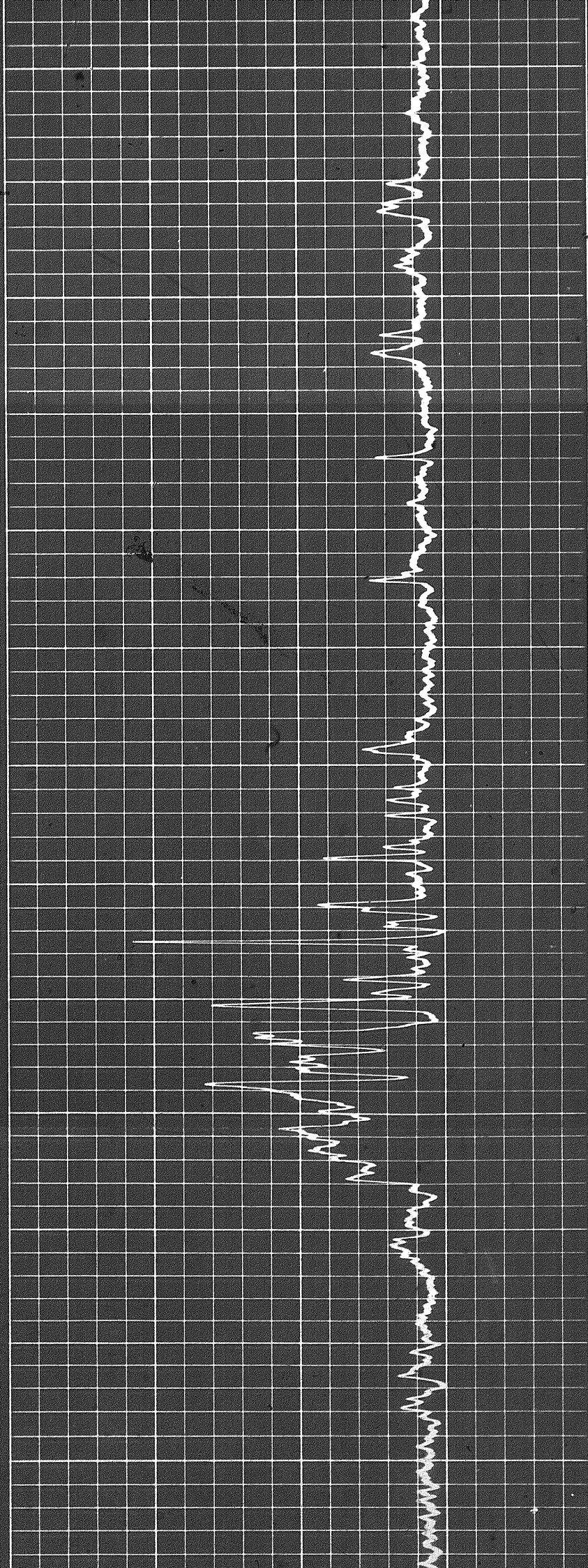
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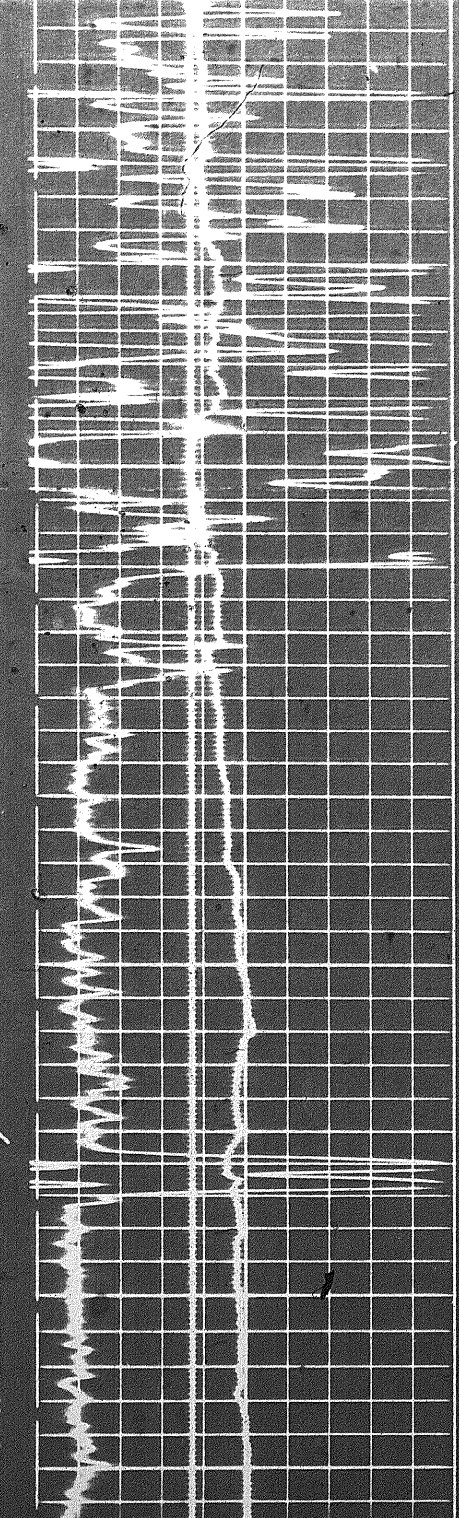
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5700

5800

5





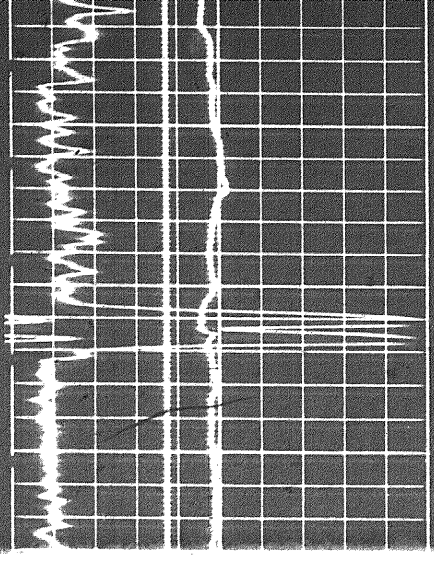
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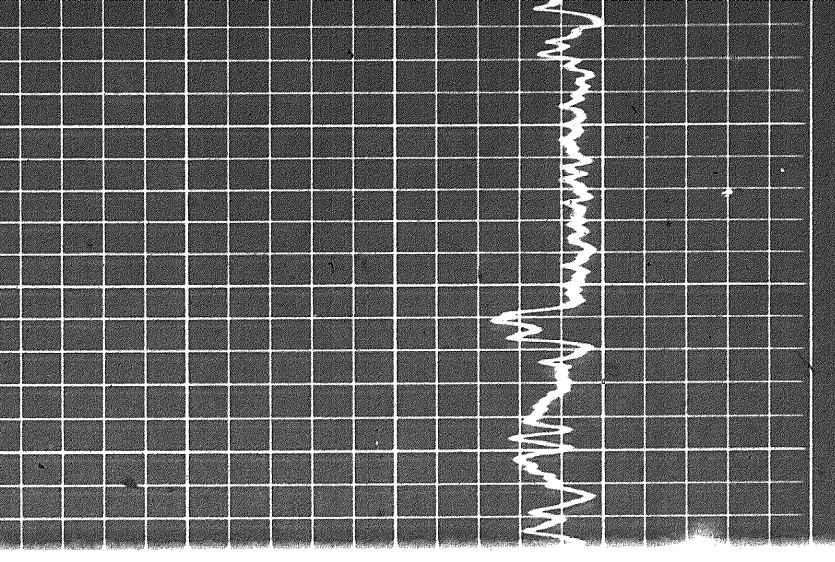
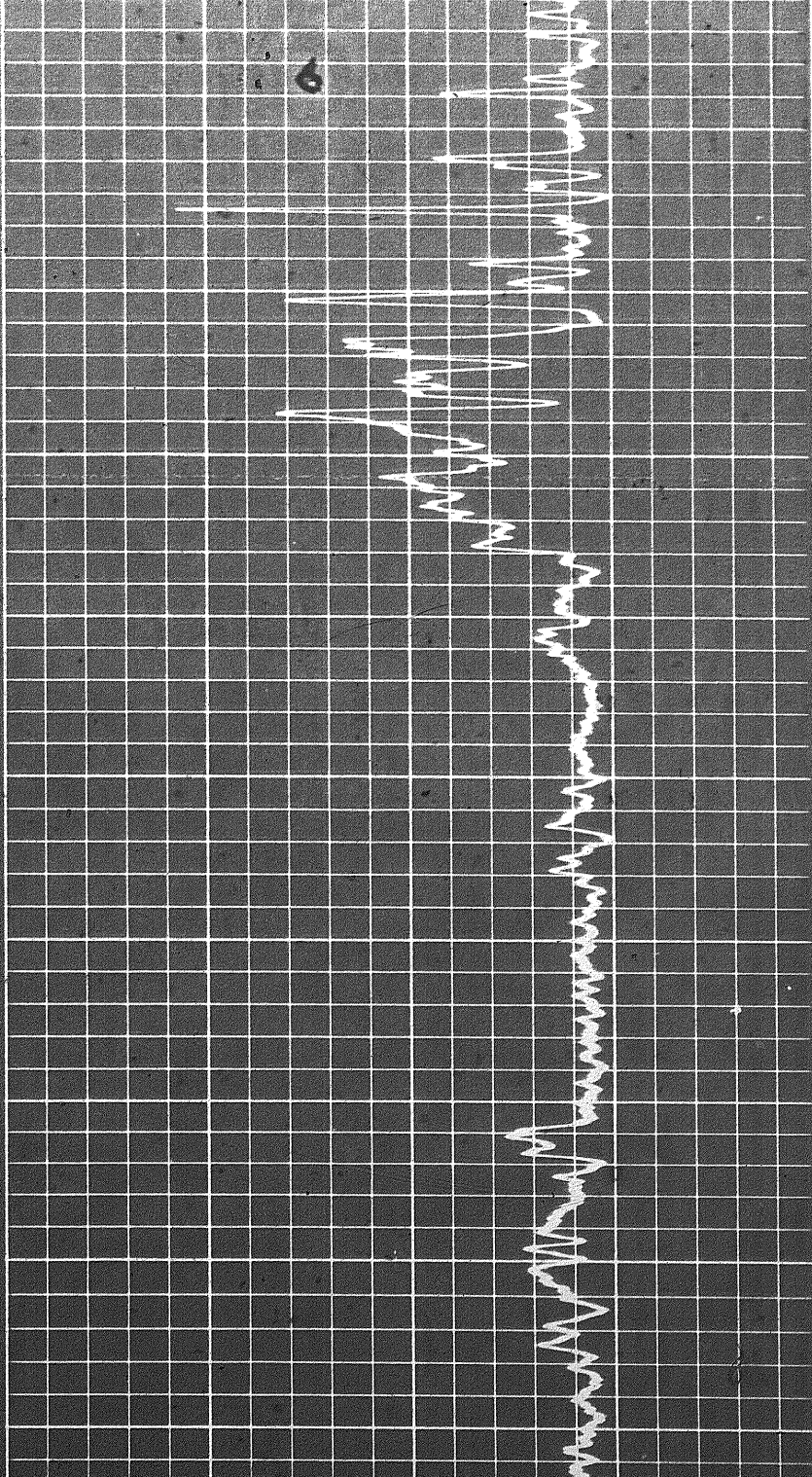
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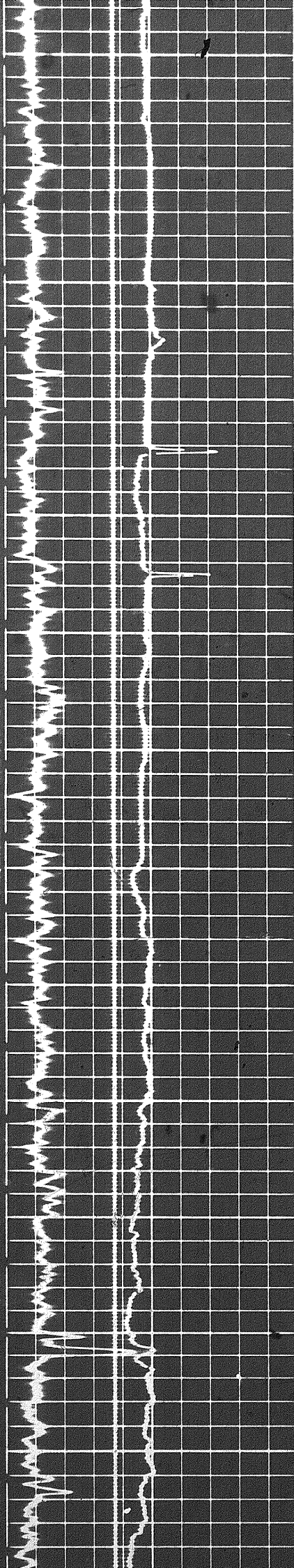
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5900



5-9



6000

6100

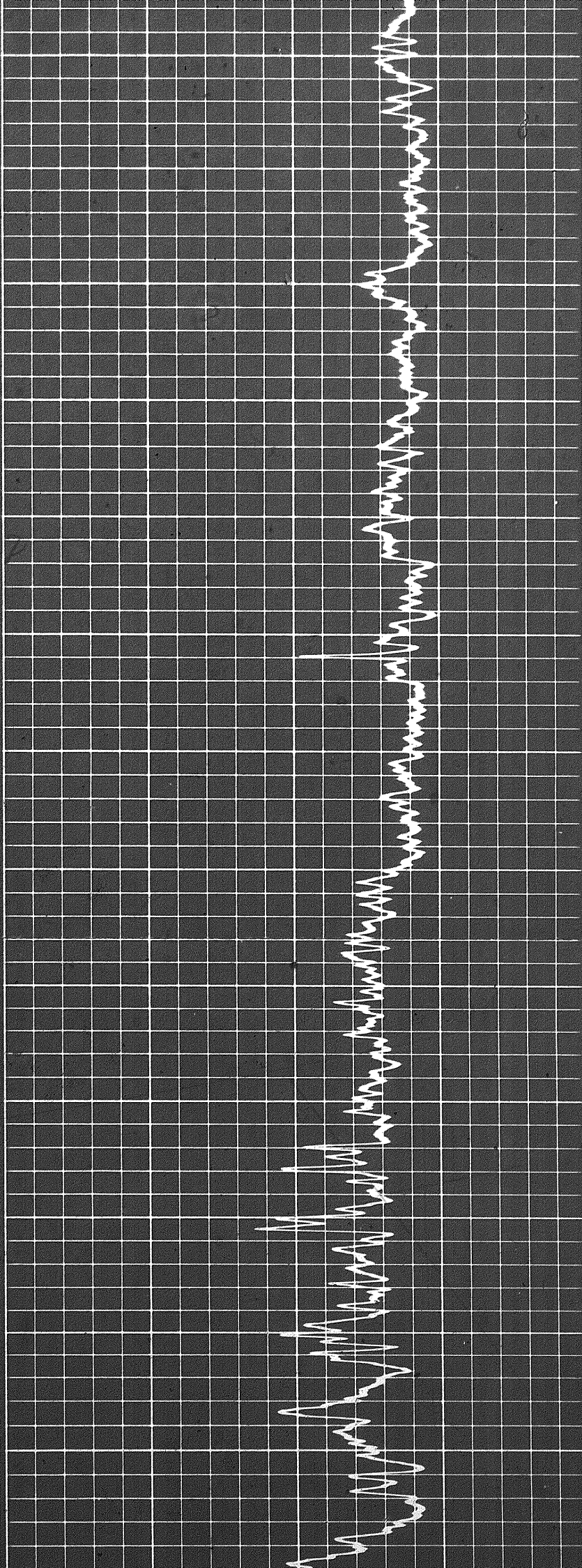
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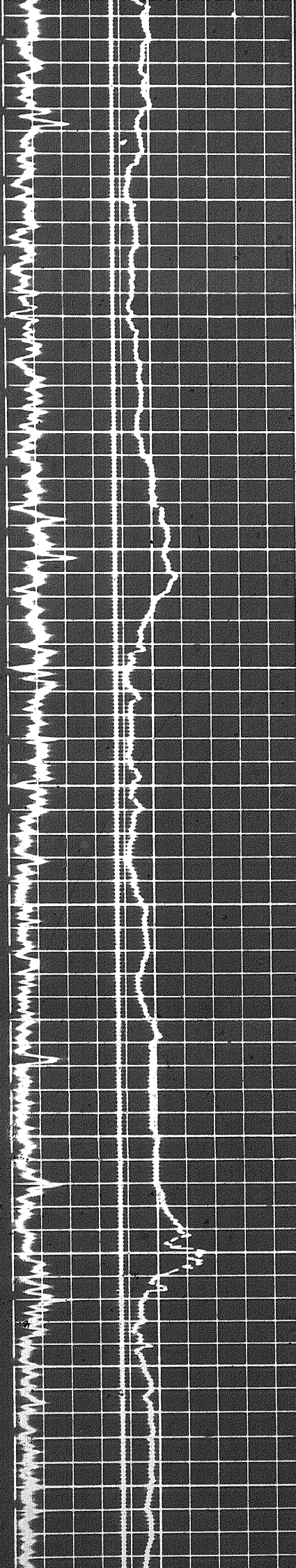
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6600





6600

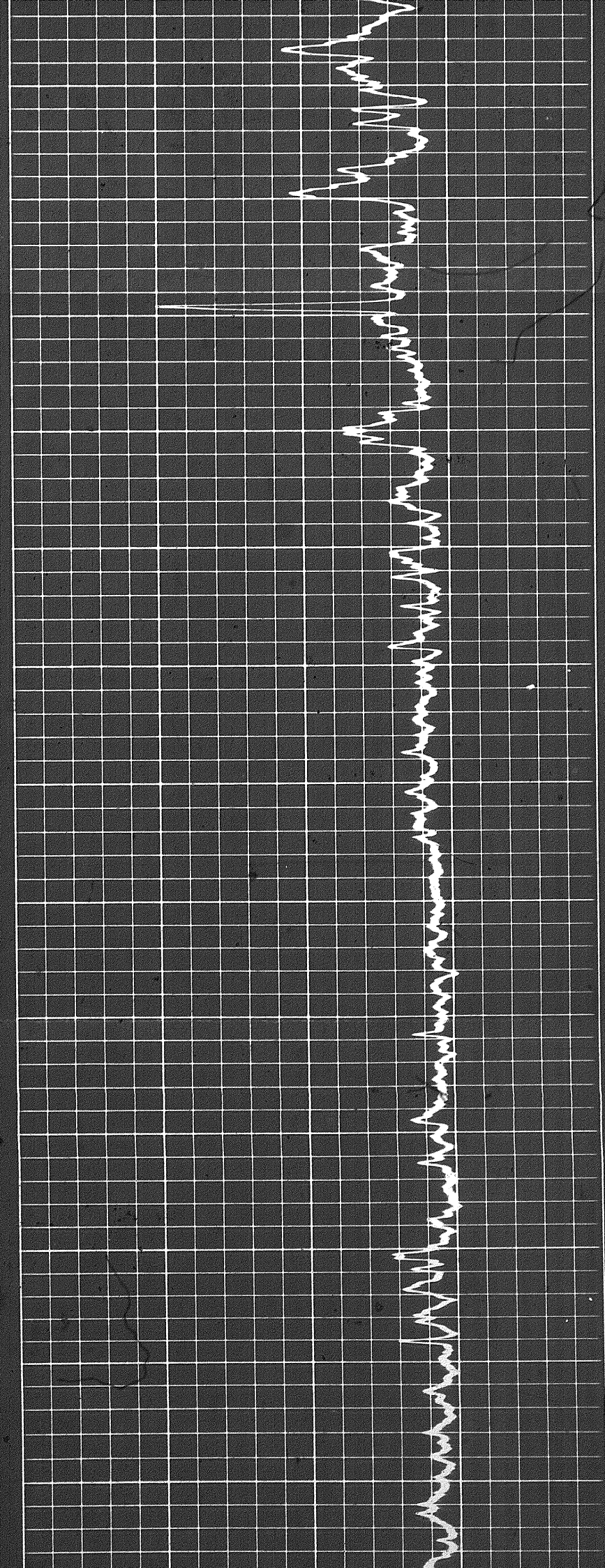
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6800

6900

7000

7100



6800

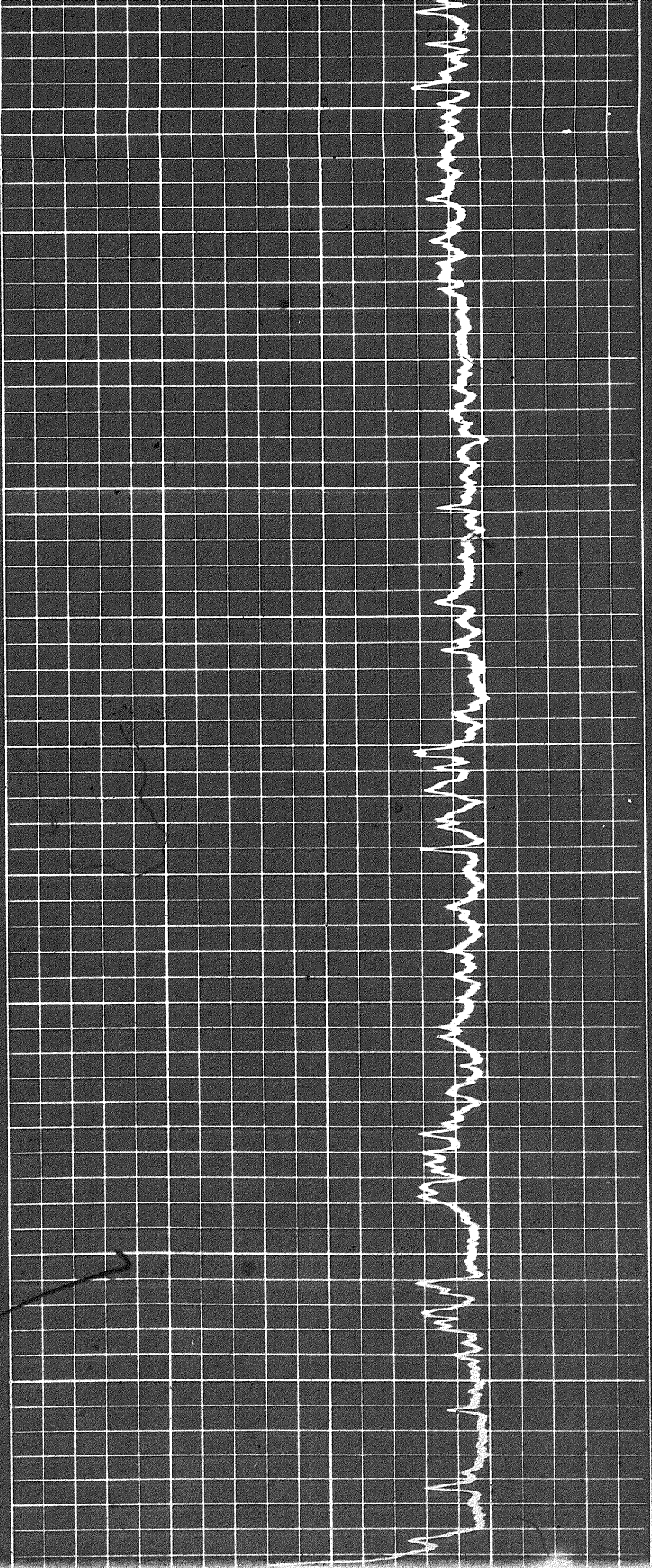
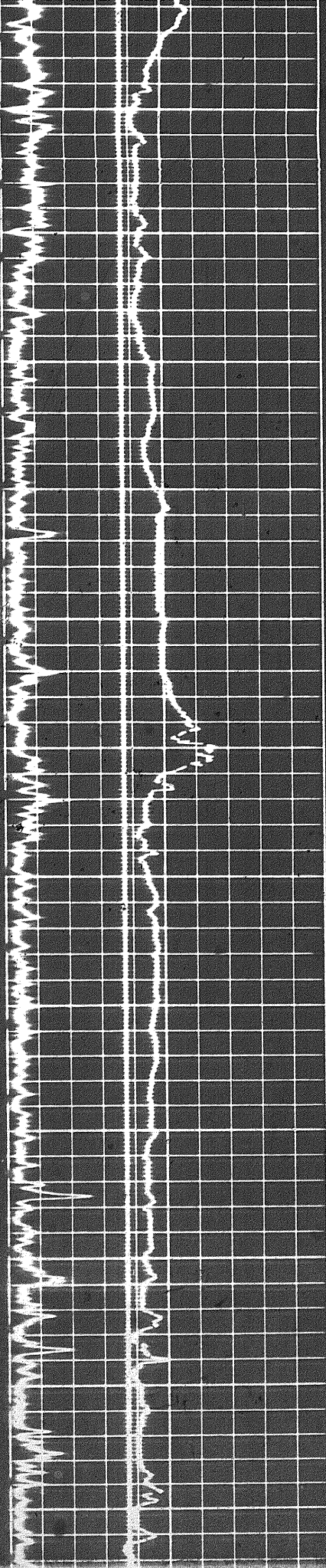
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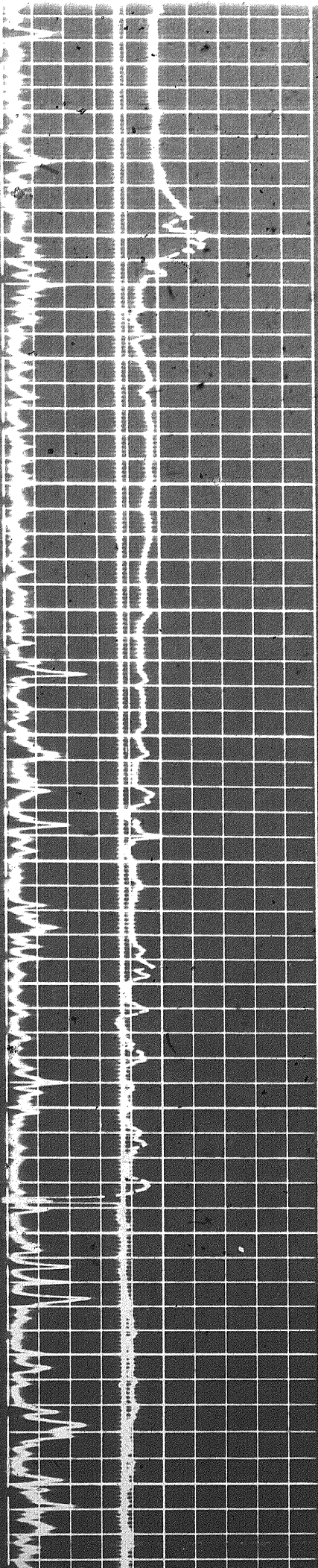
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7100

7200

7300





7000

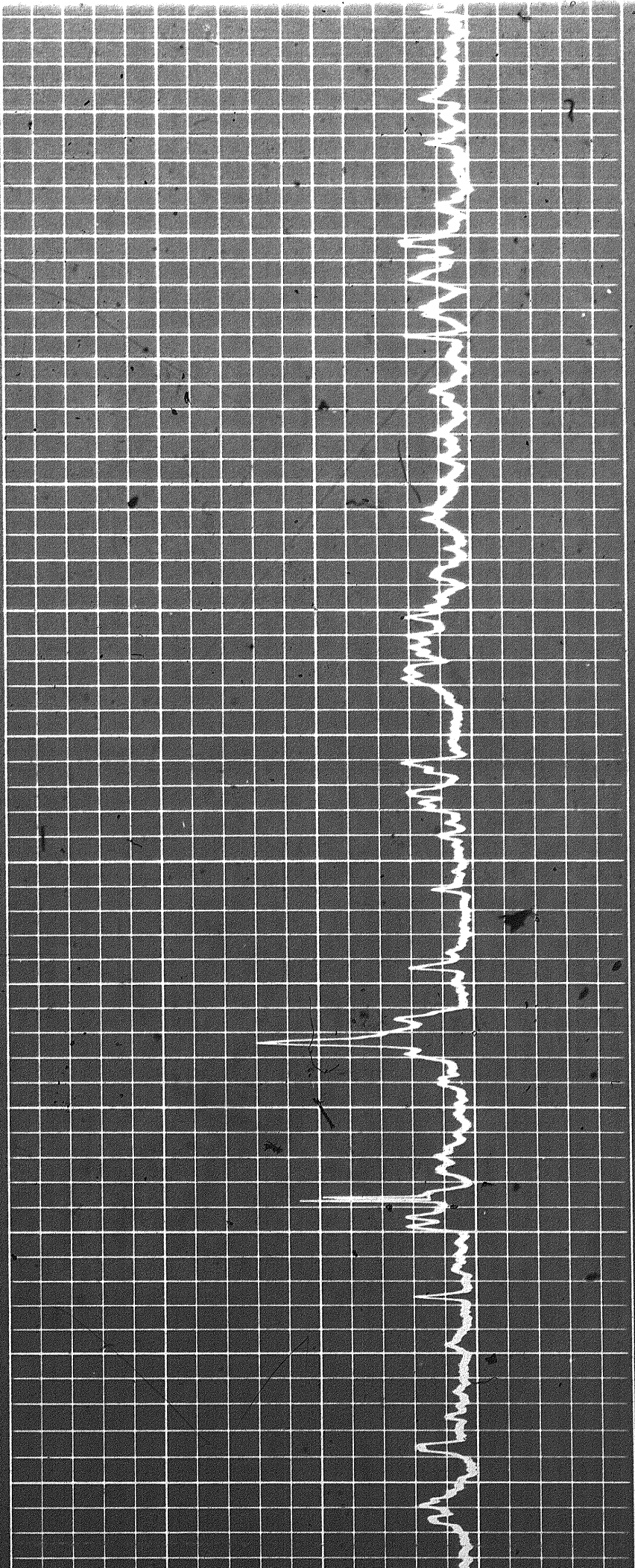
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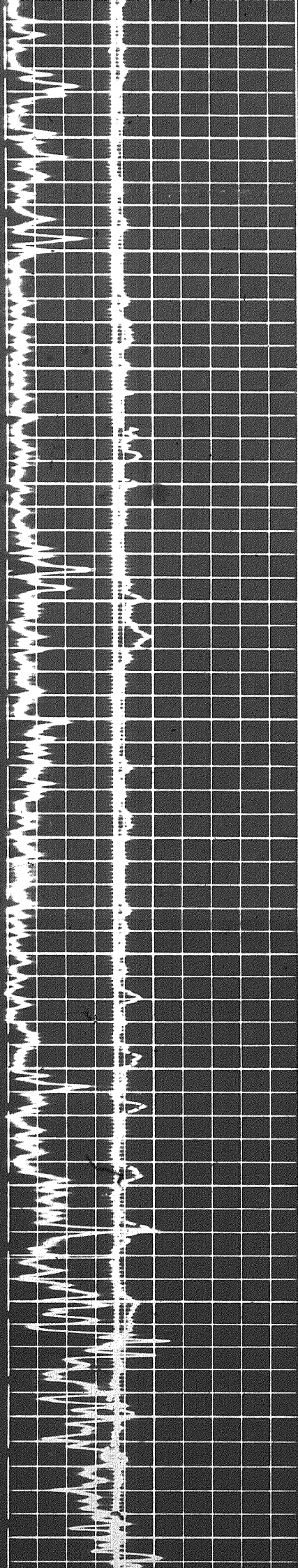
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7400

7500



10



7500

7600

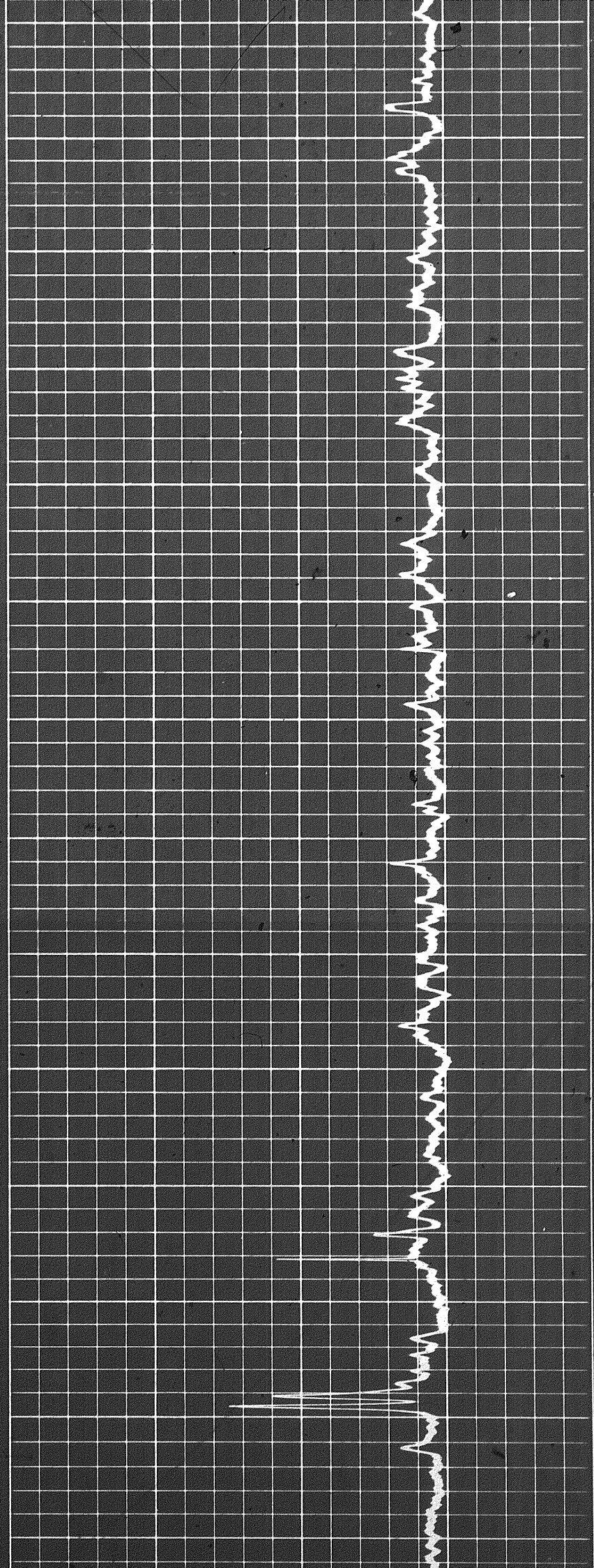
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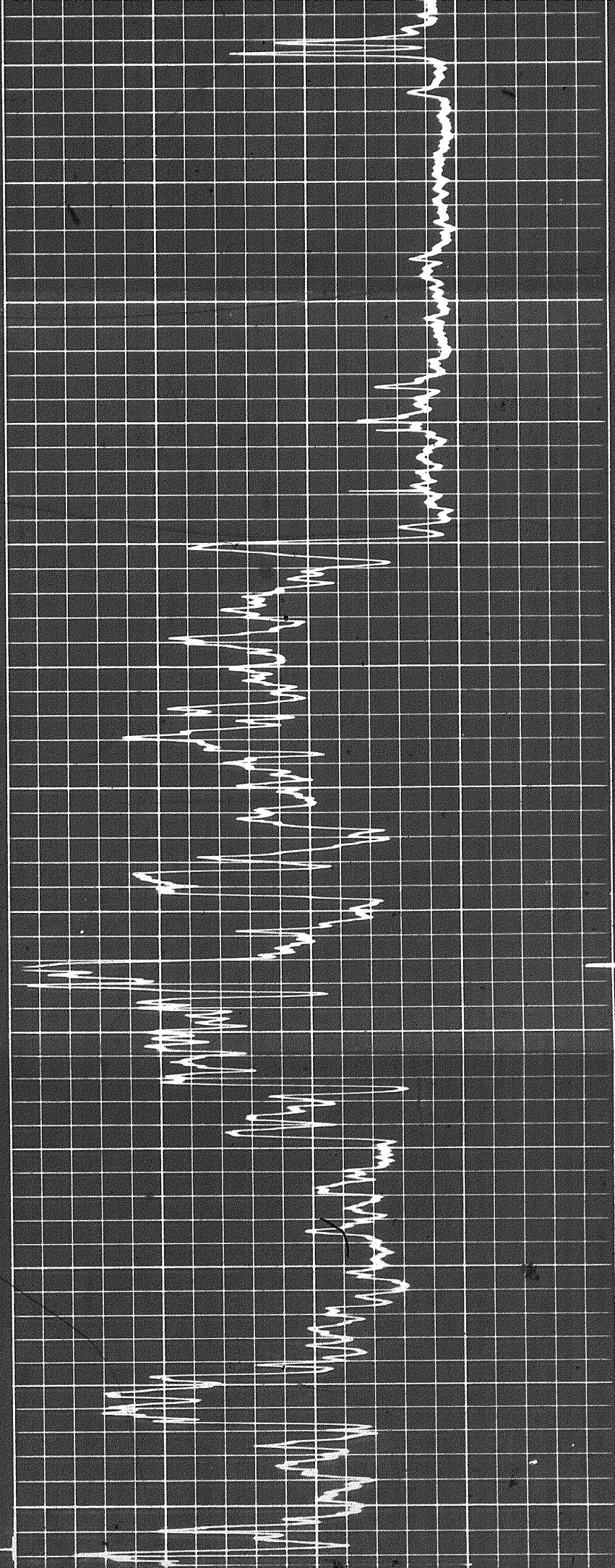
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7900

8000

8100





8100

8200

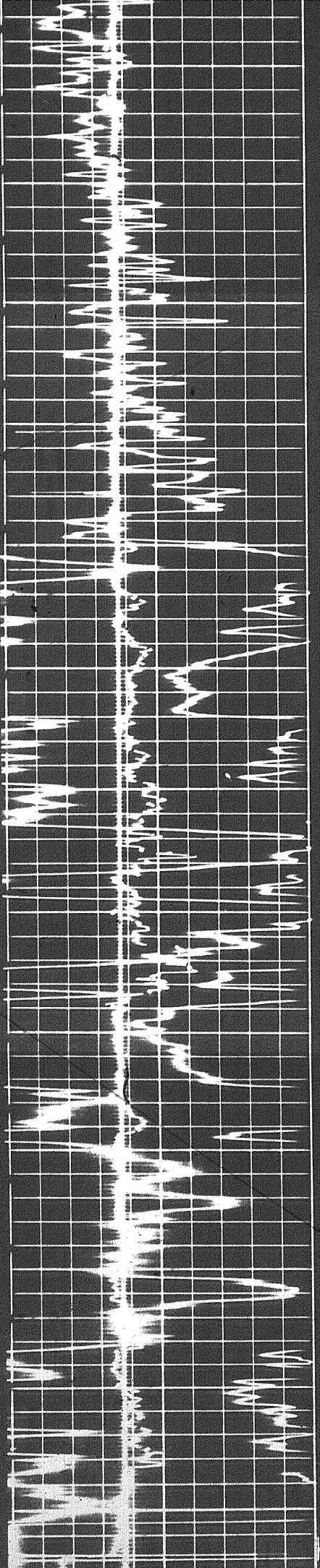
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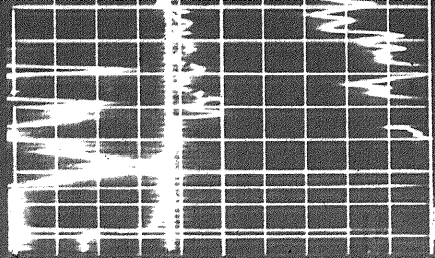
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8500

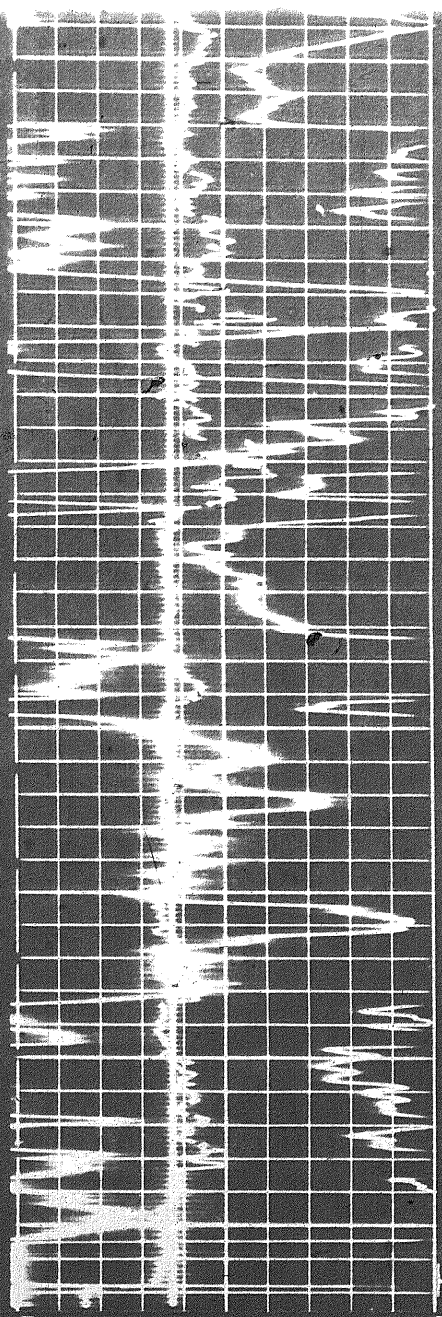
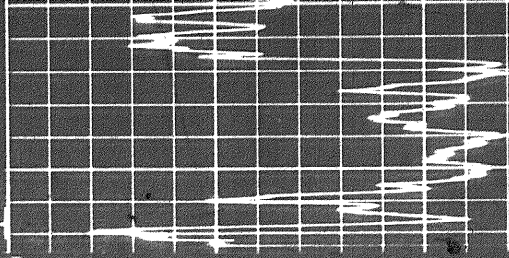
8600

8700 R





8700 R

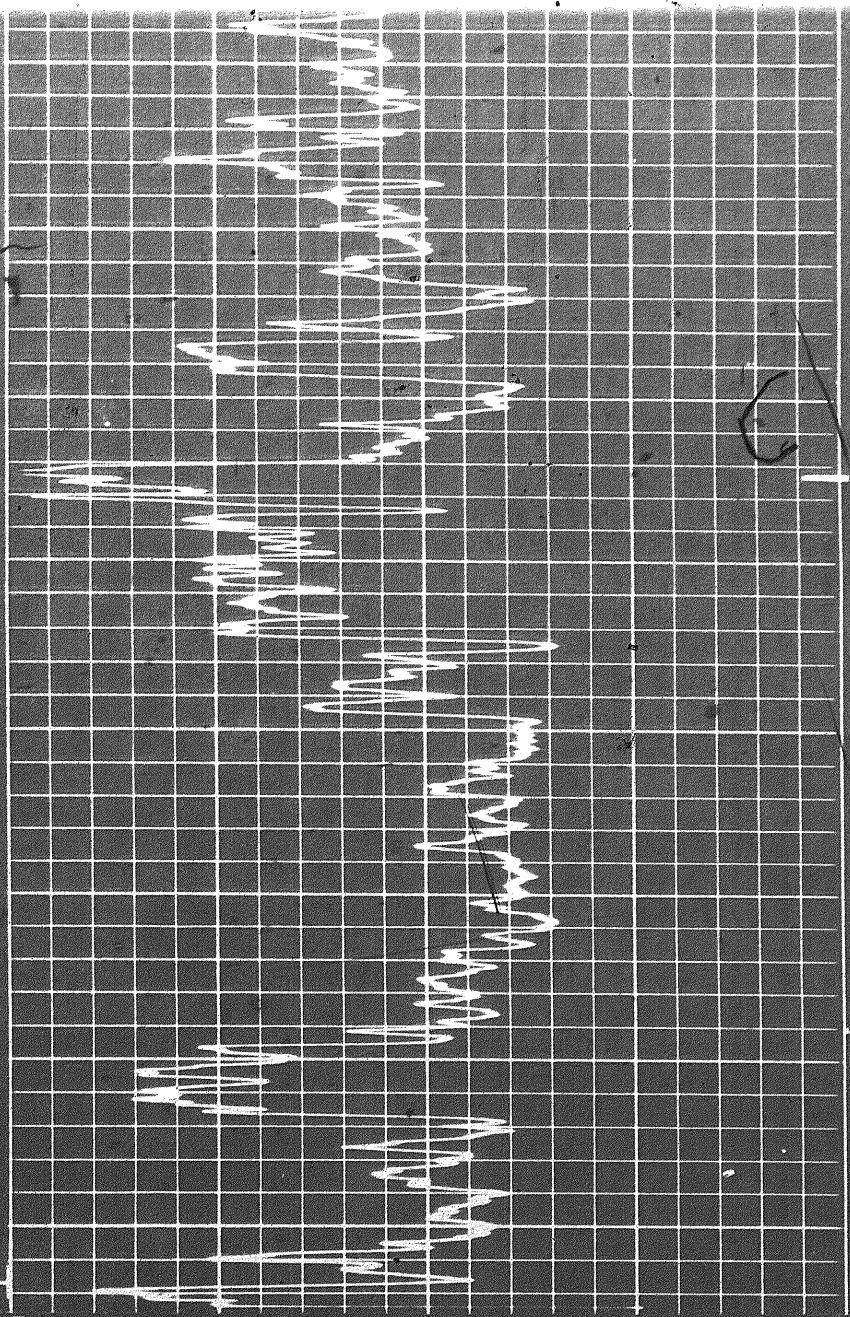


8400

8500

8600

8700 R



Sens. 100 T.C. 2
 Zero 0 div. to left
 0 100
 100 200

Sens. 100 T.C. 2
Zero 0 div. to left

0 100
100 200

GAMMA RAY
API UNITS

Speed in FPM

6 7 8 9 10 11 12 13 14

30 20 10 0 -10

LIMESTONE

CALIPER
hole diameter in inches

DEPTHS

POROSITY (%)

DETAIL LOG
5" = 100'

RUN 1

CALIPER
hole diameter in inches

DEPTHS

POROSITY (%)

Speed in FPM

7 8 9 10 11 12 13 14 15

GAMMA RAY
API UNITS

30 20 10 0 -10

LIMESTONE

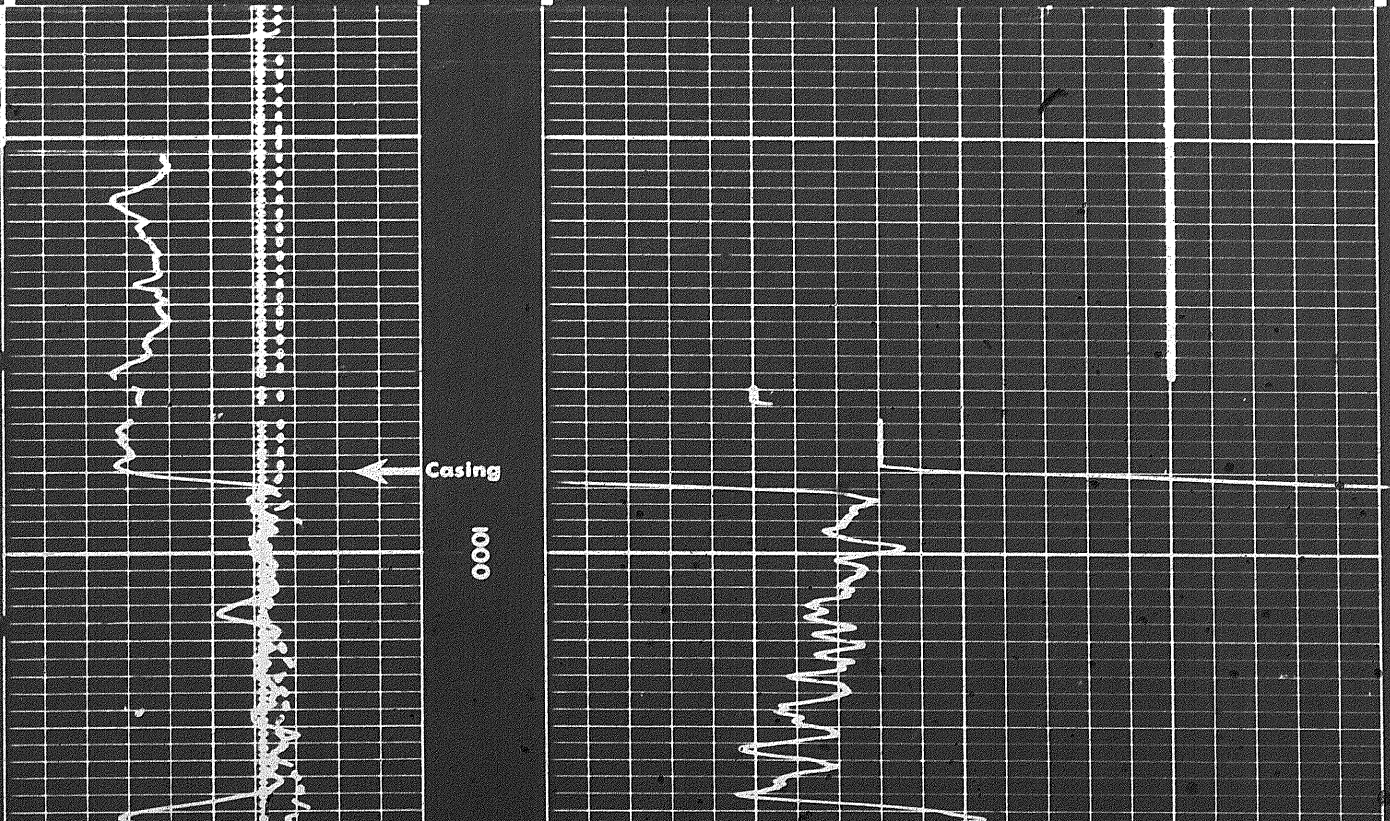
Sens. 150 T.C. 2
Zero 0 div. to left

0 150
150 300

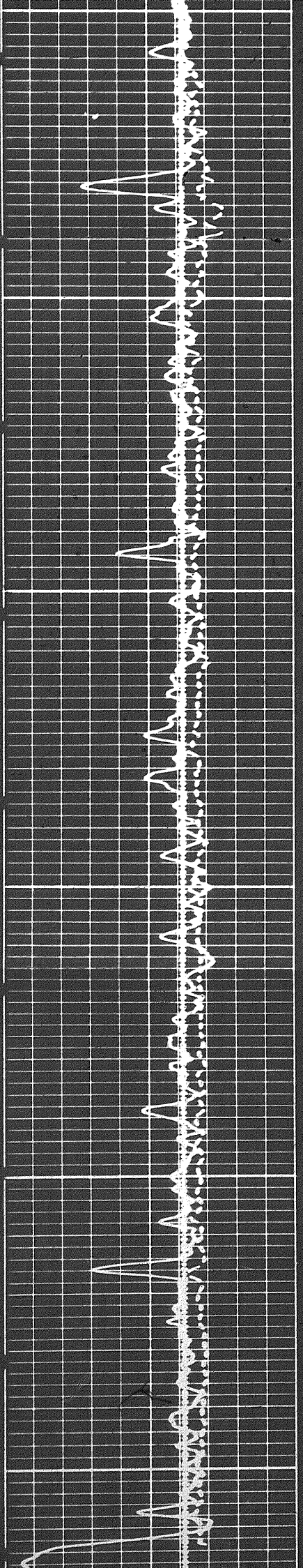
Casing

1000

70



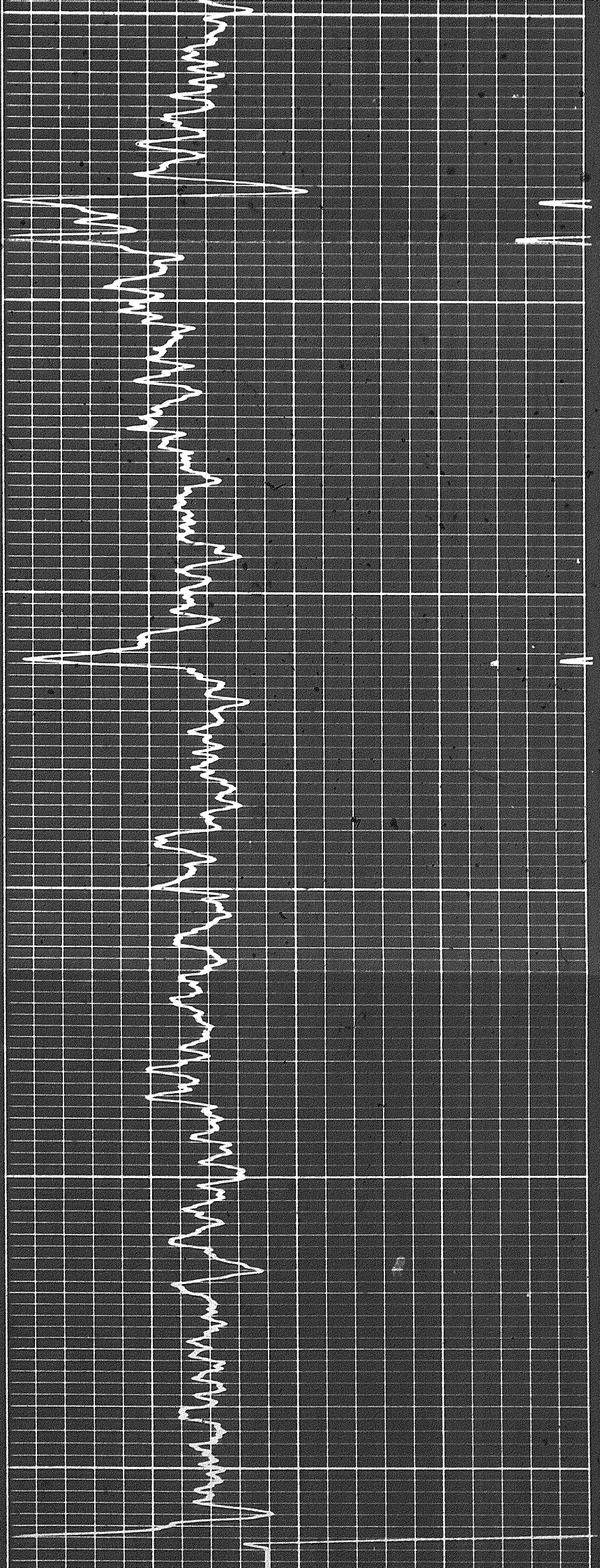
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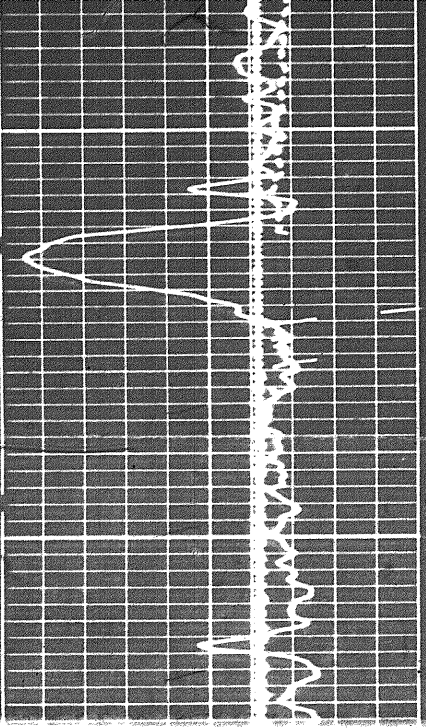


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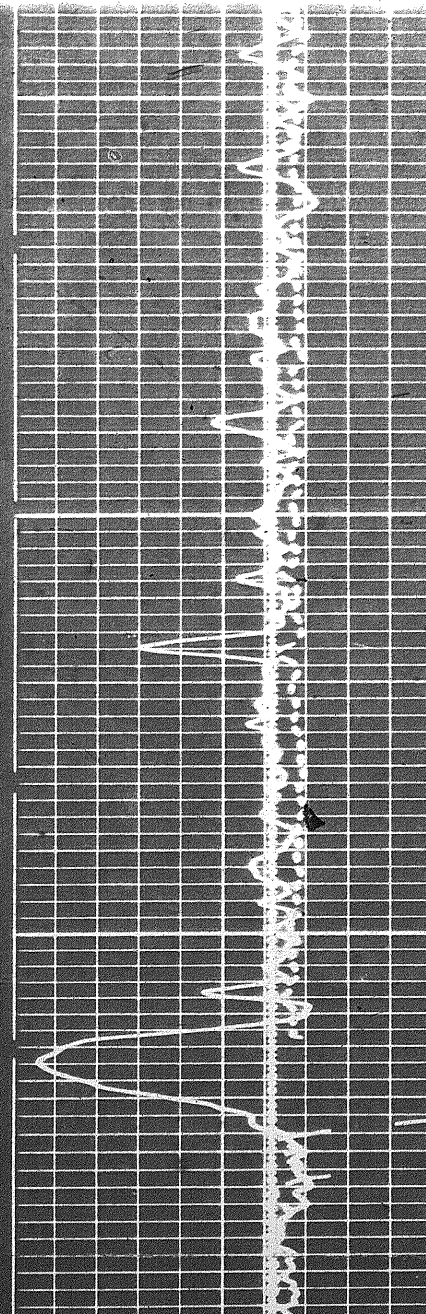
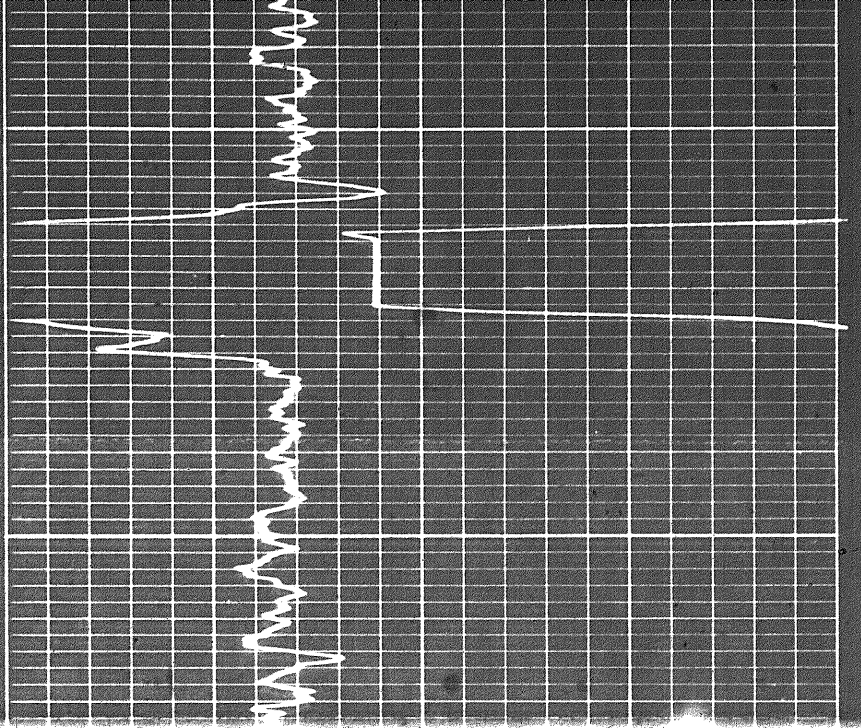
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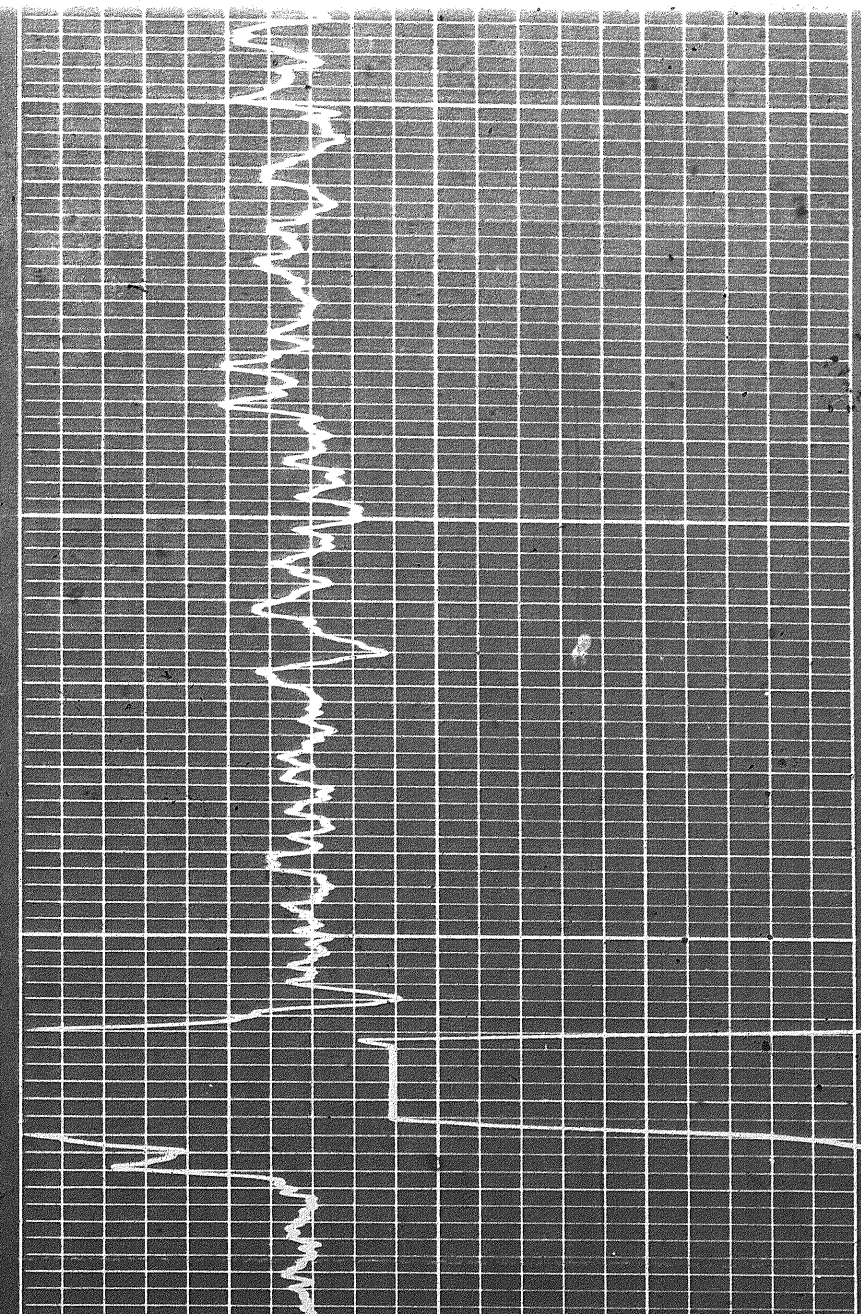


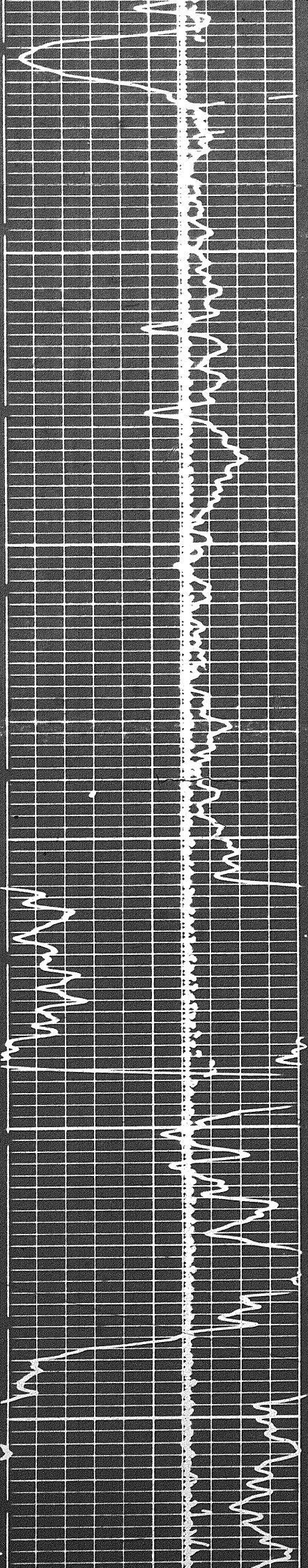


1300



1200

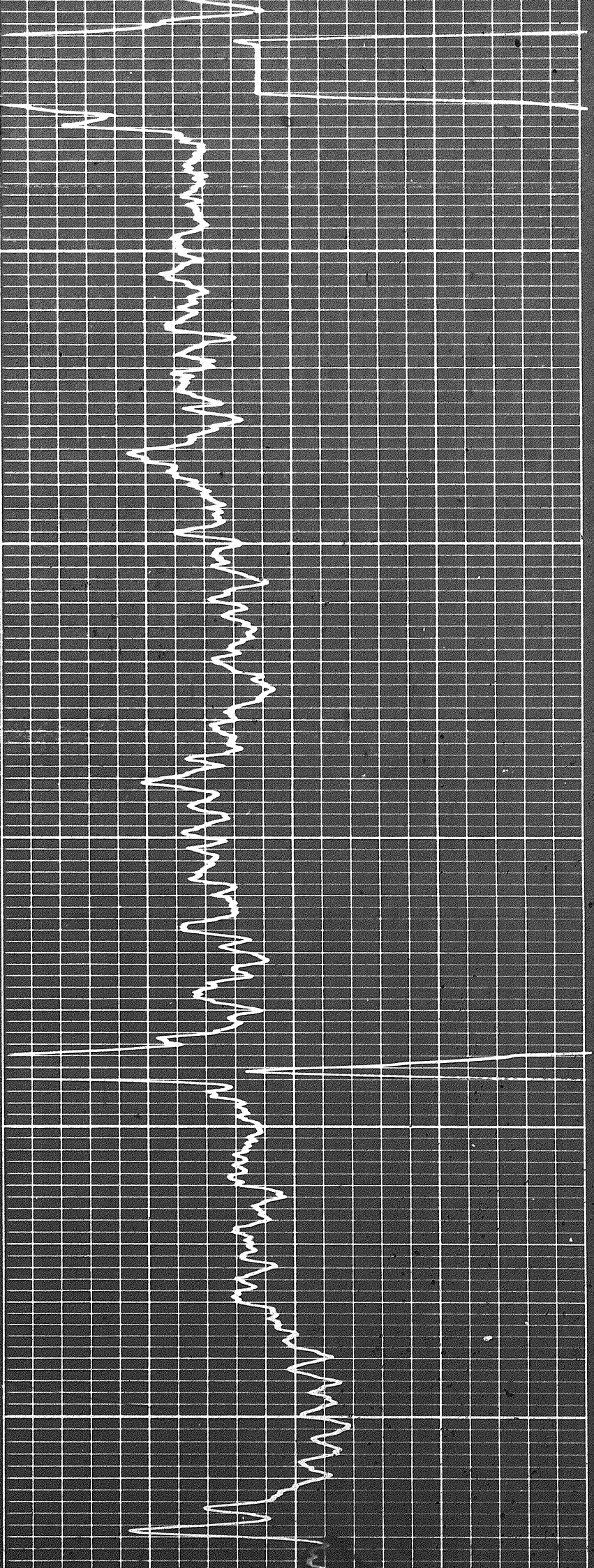


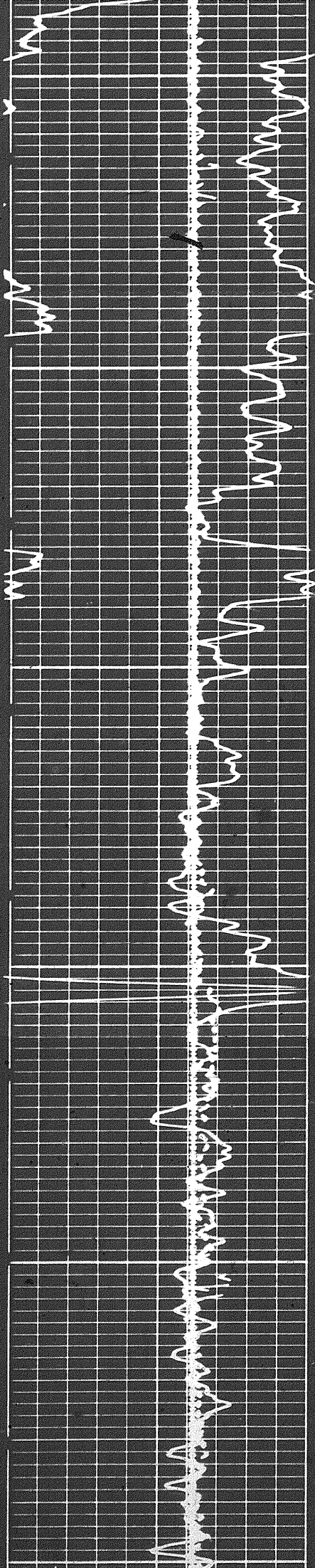


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1400

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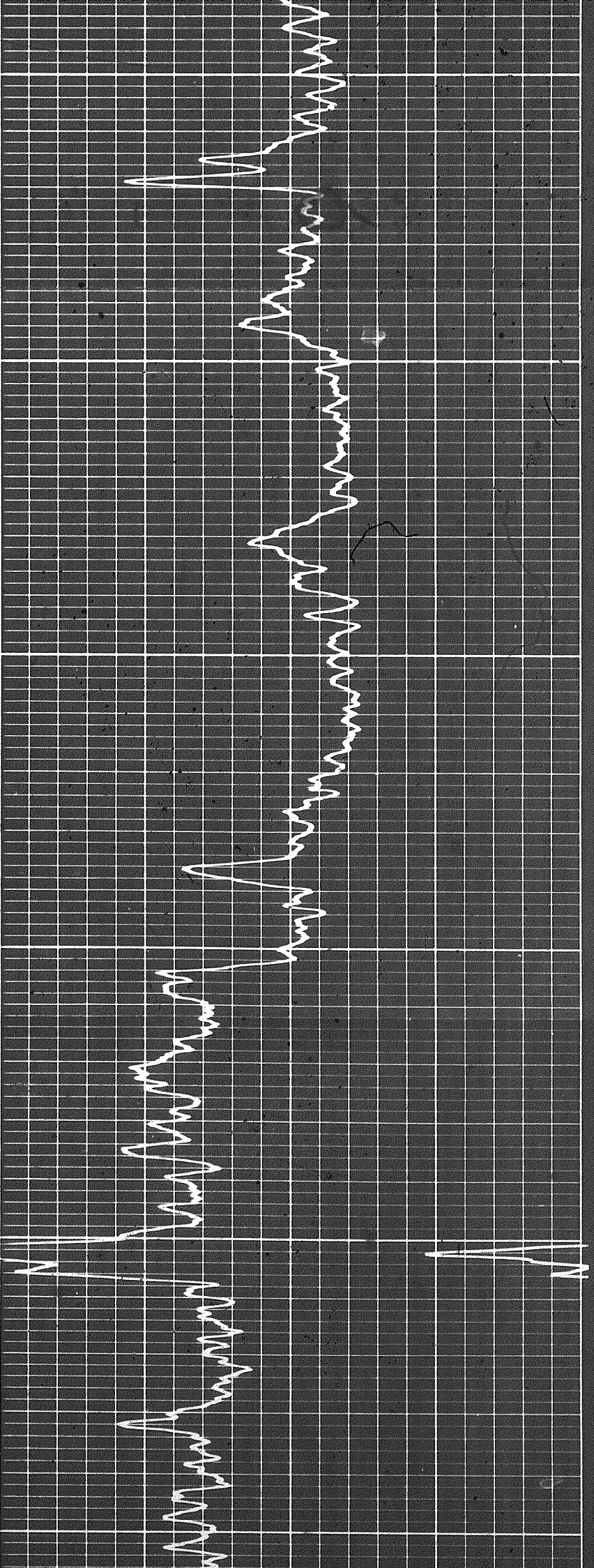


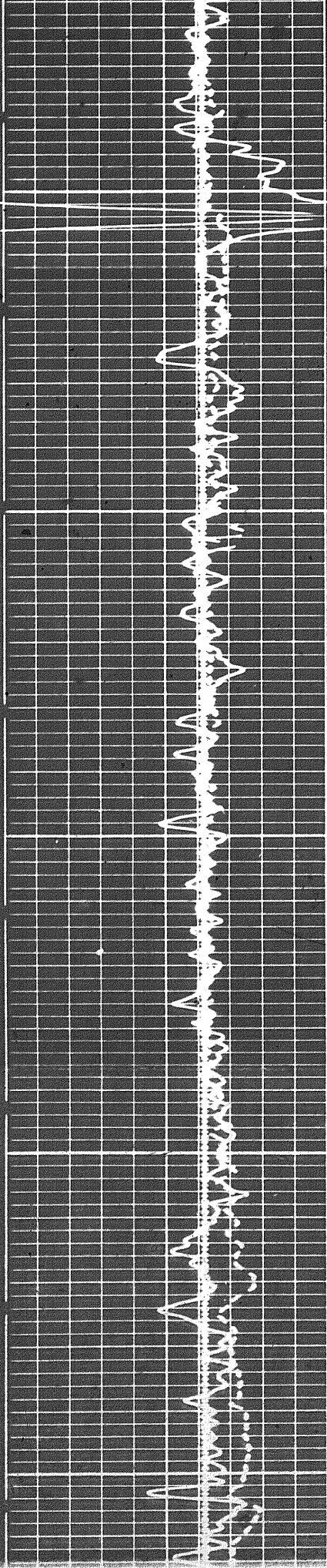


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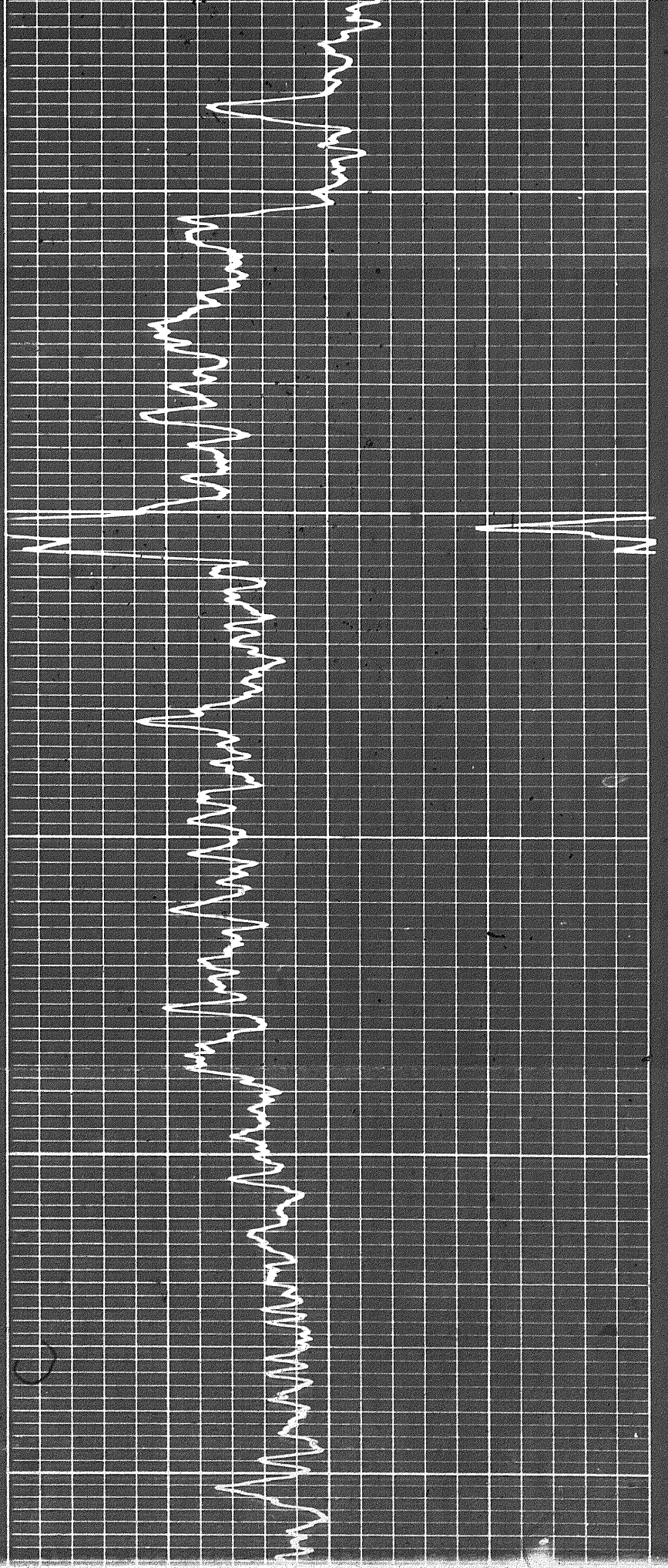
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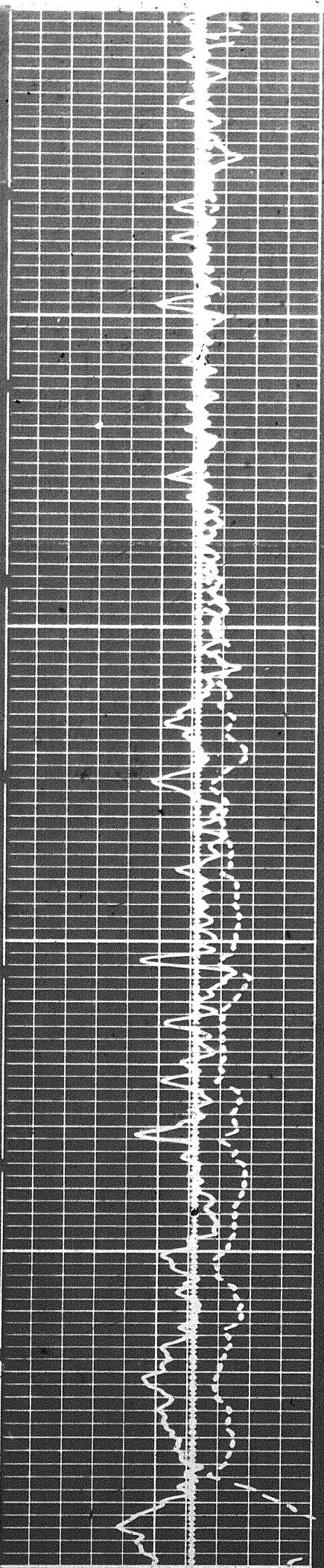




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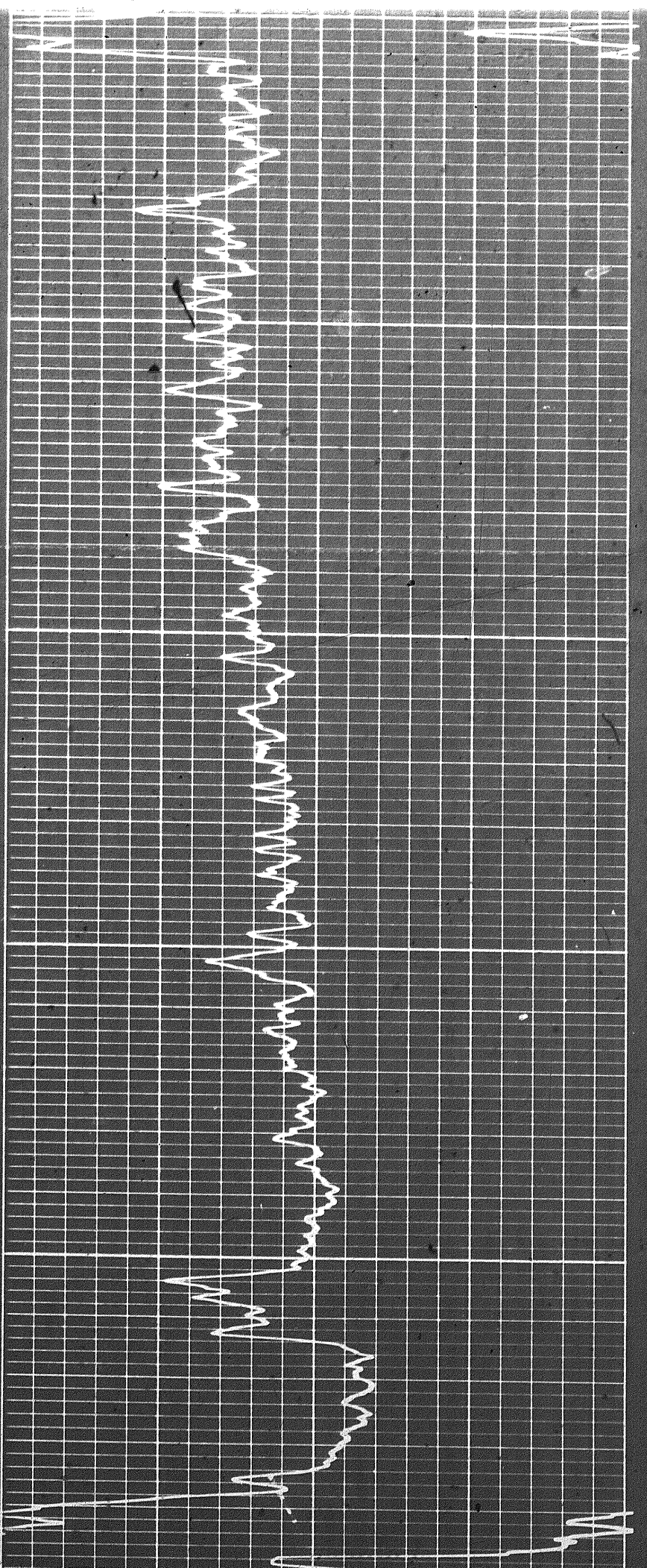


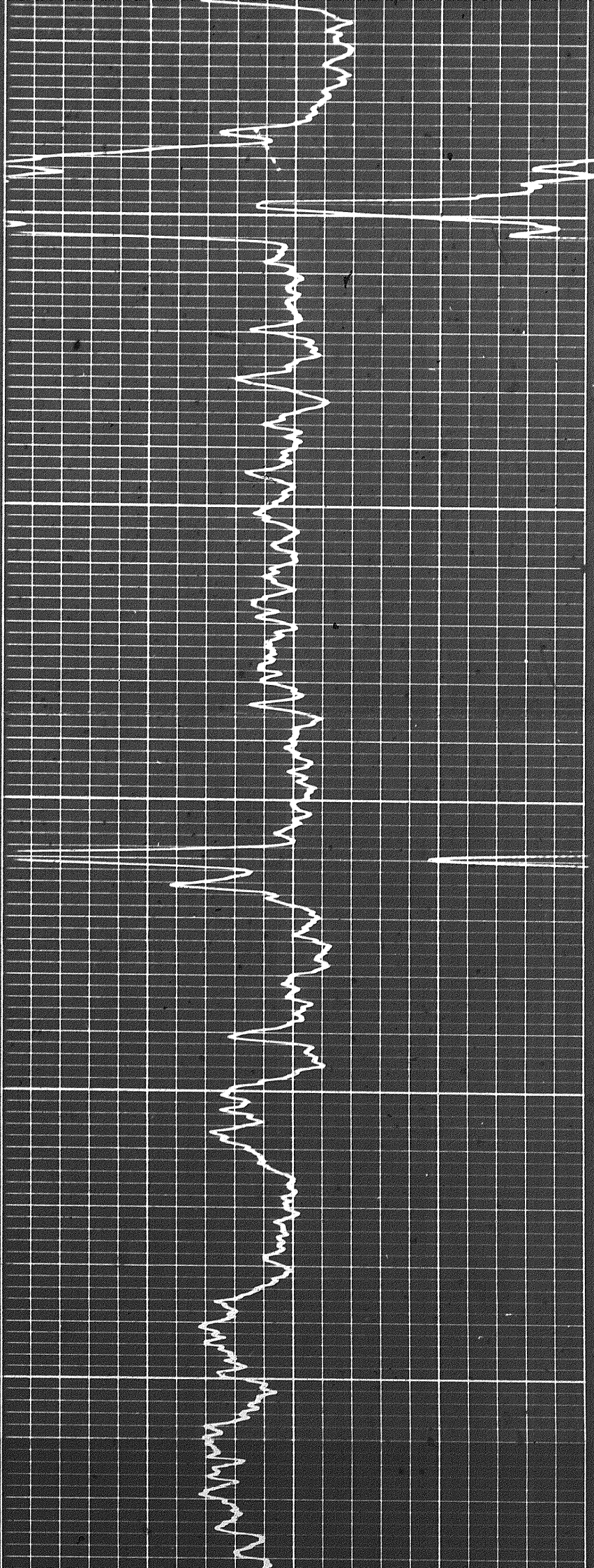


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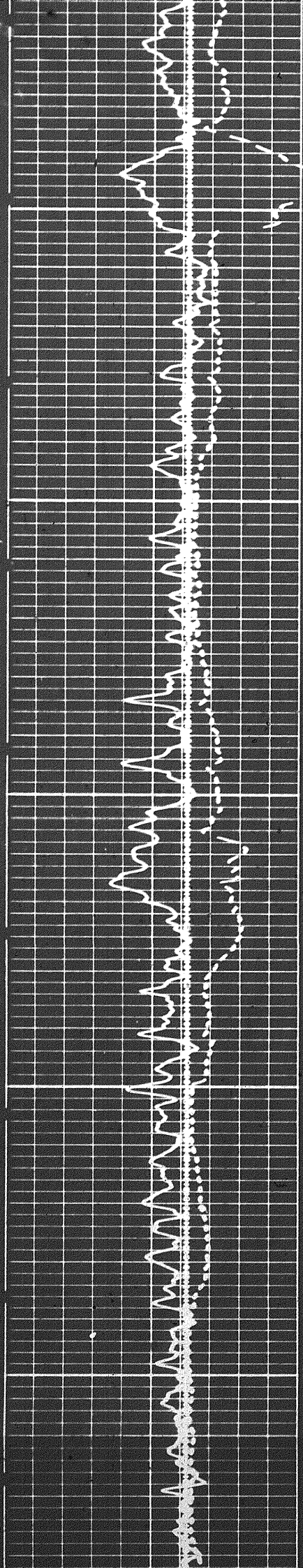
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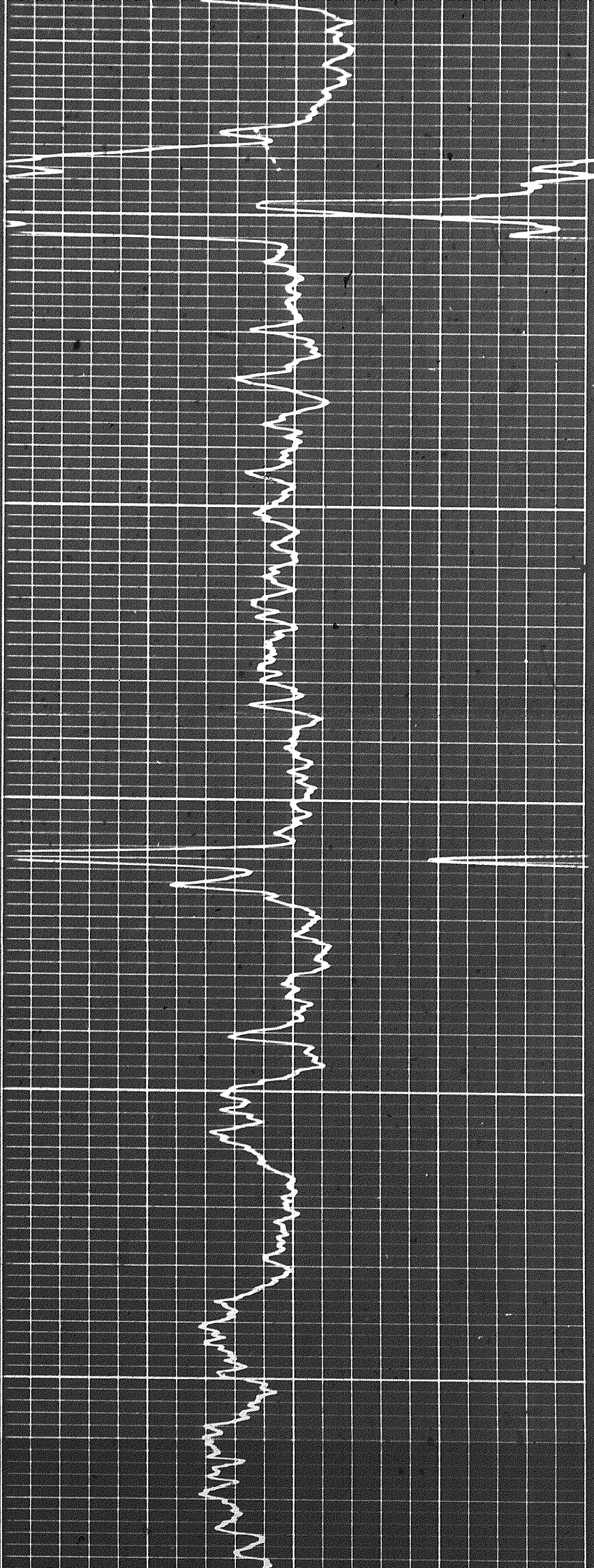




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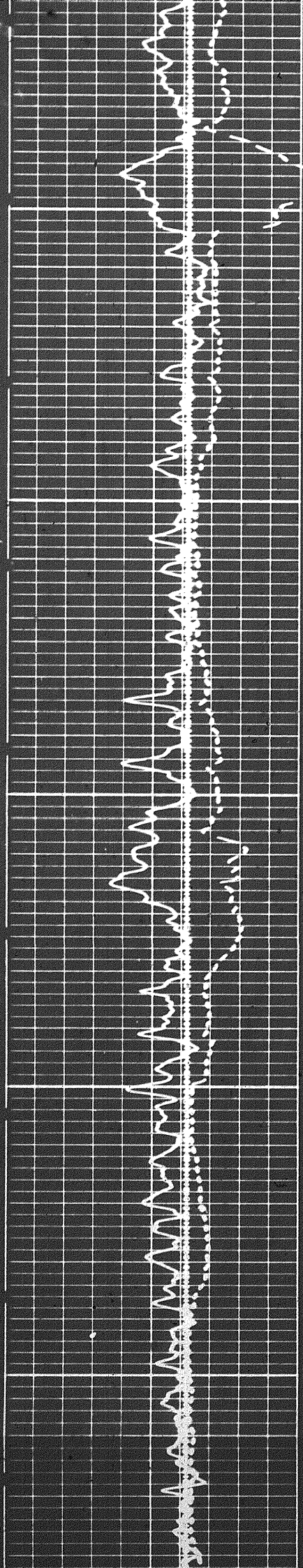
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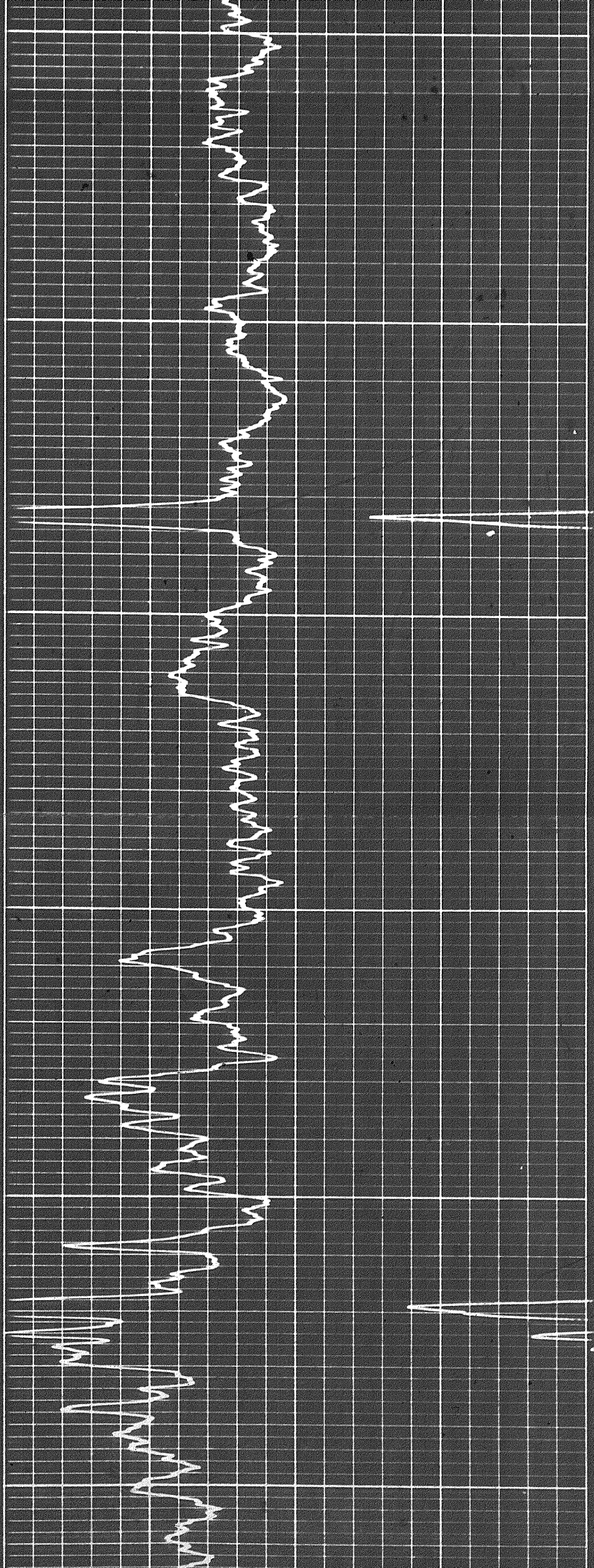




2000

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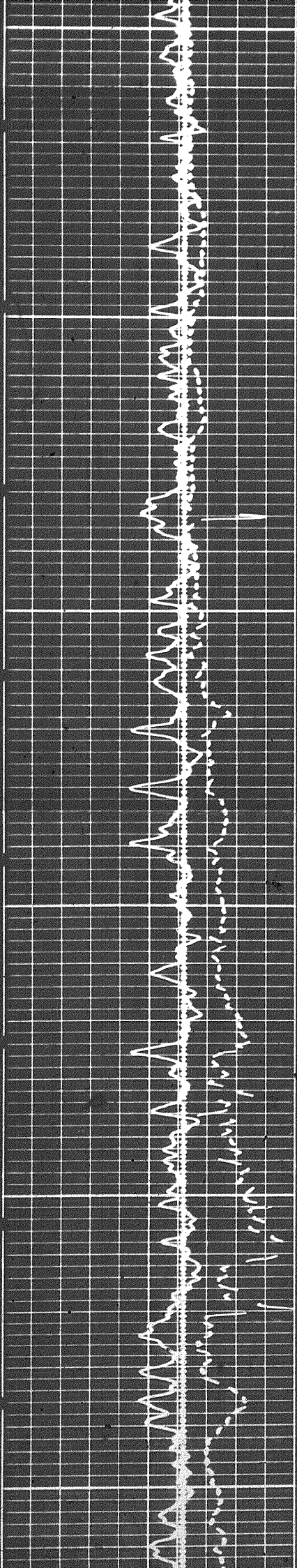


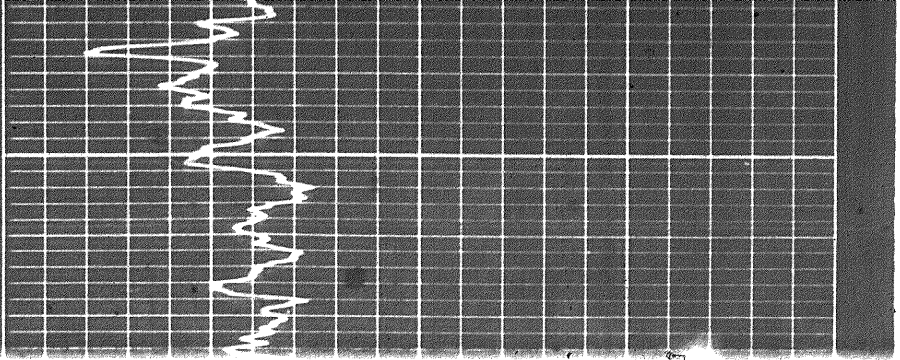


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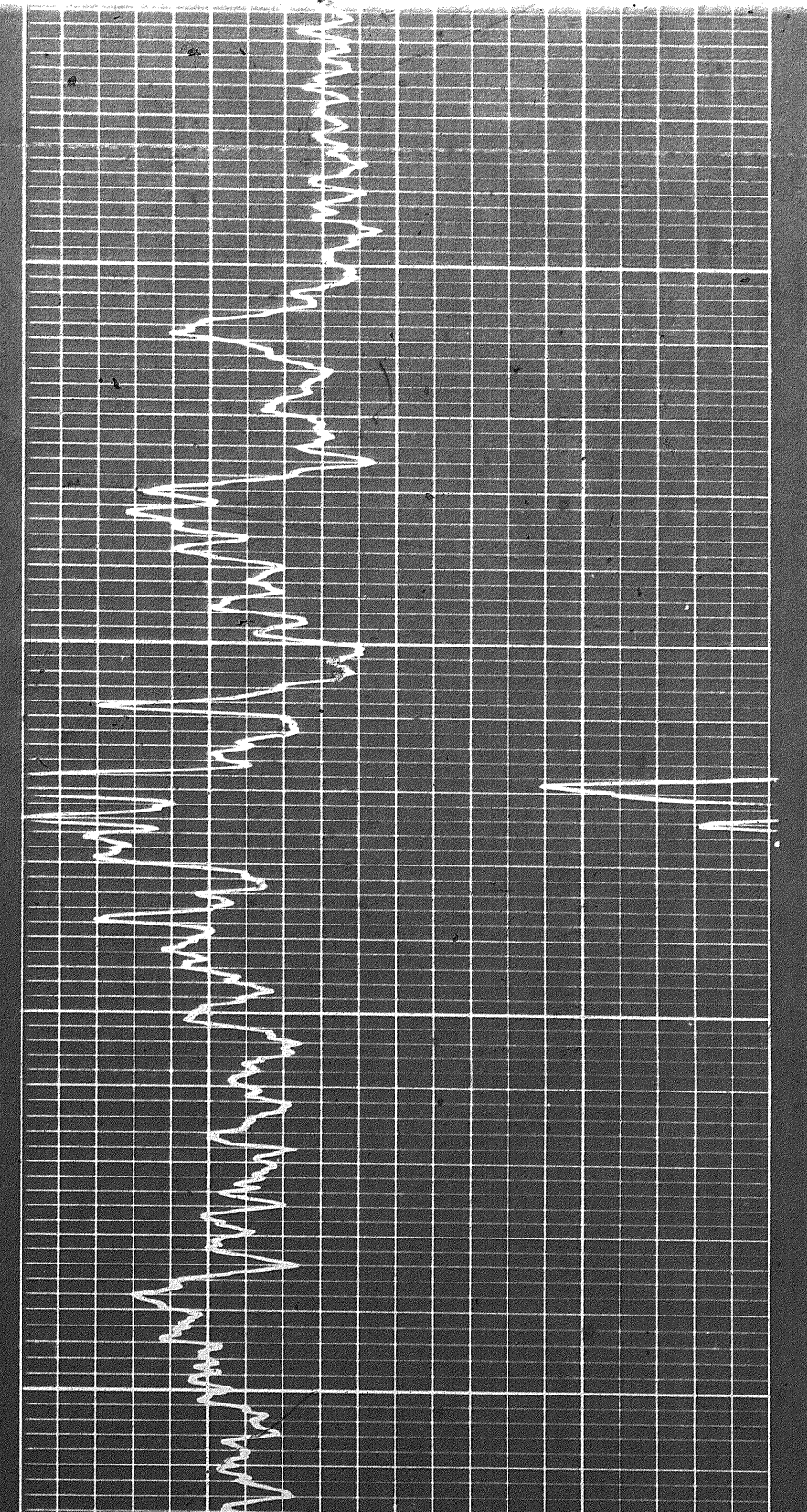
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2400



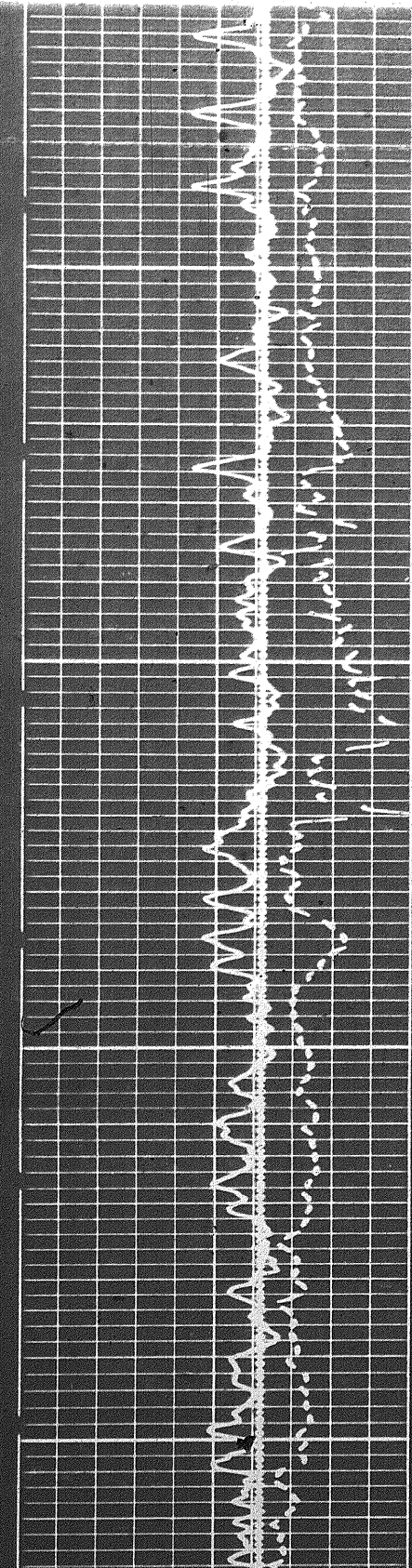
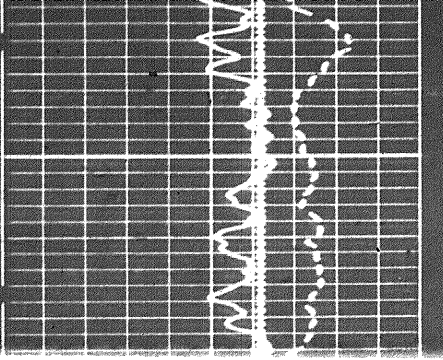


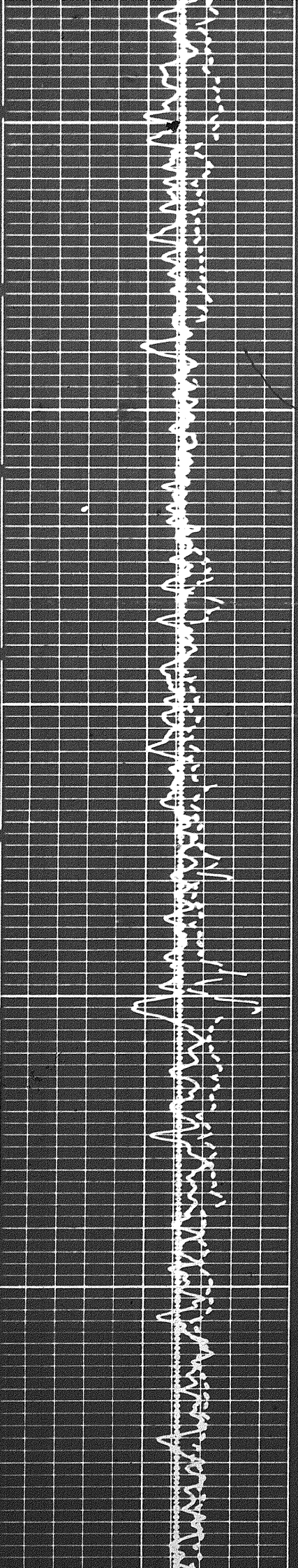
2400



2300

2400

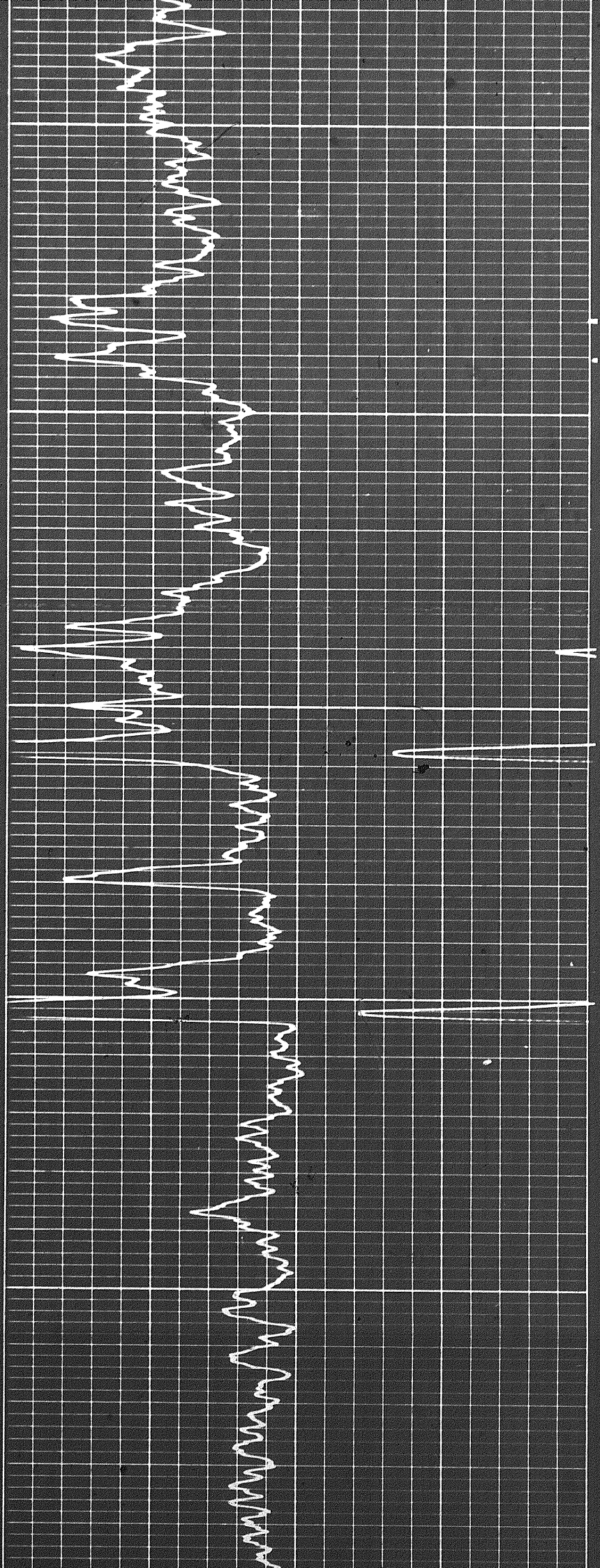


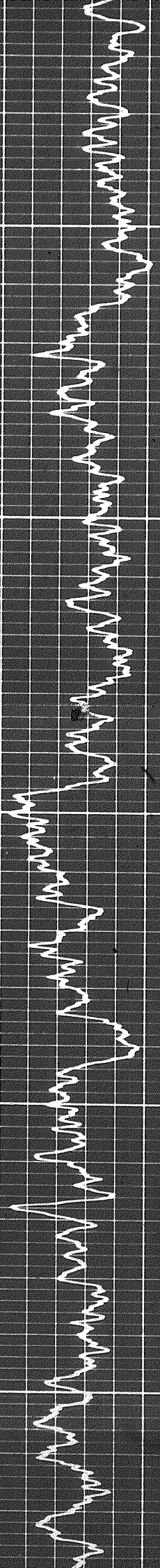


2500

2600

2



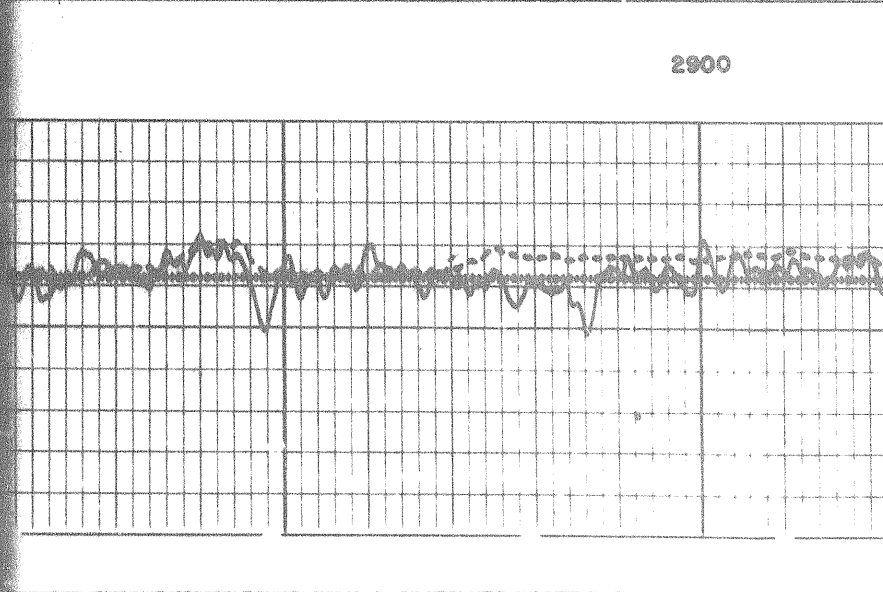
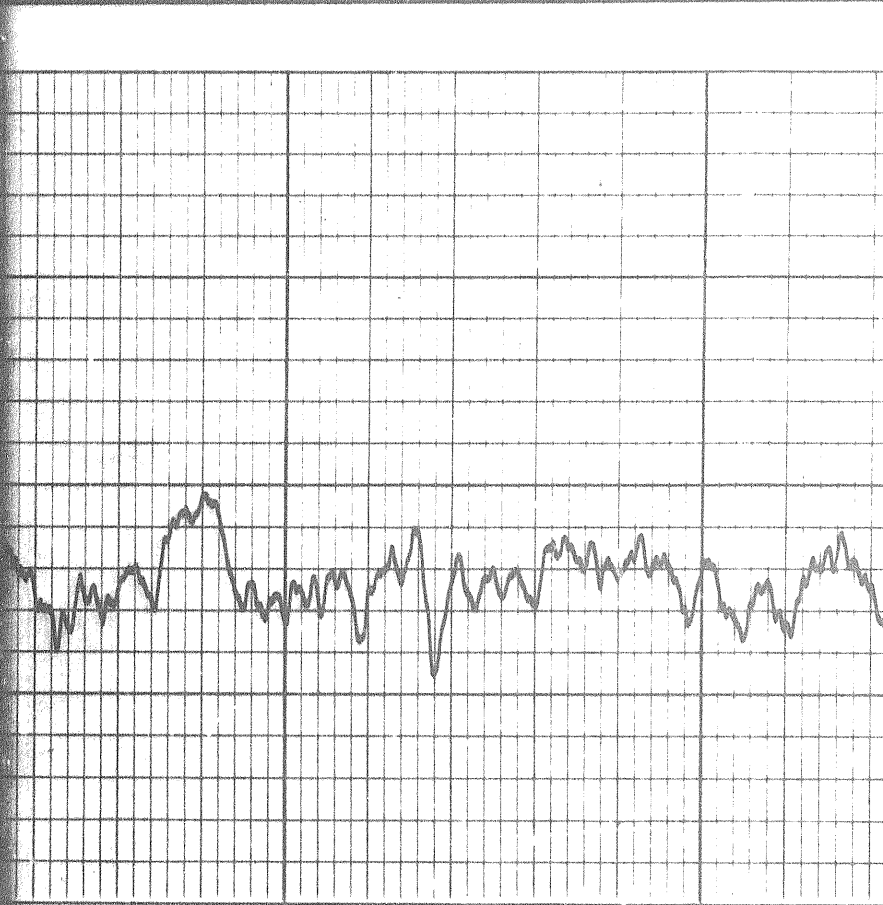
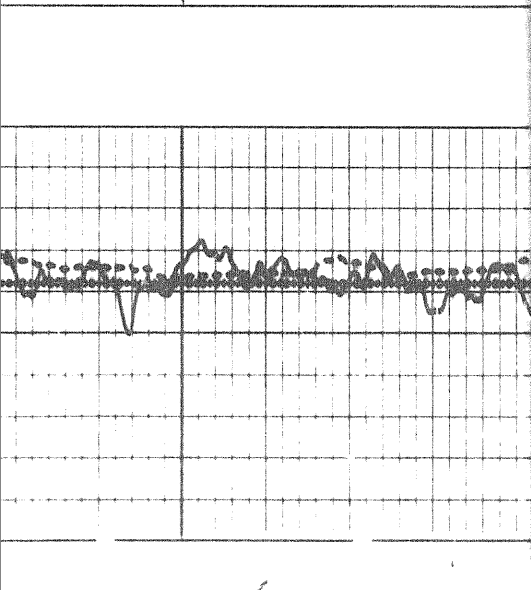
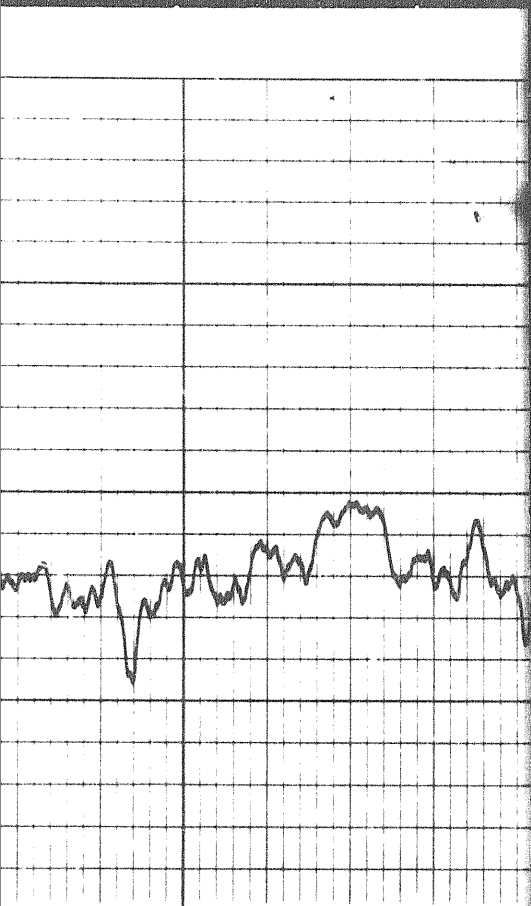


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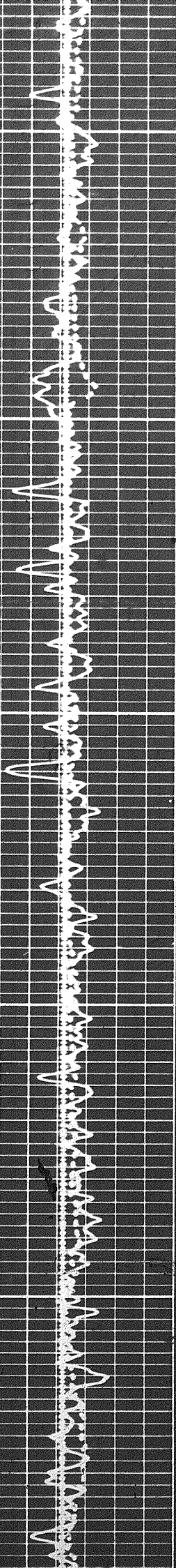
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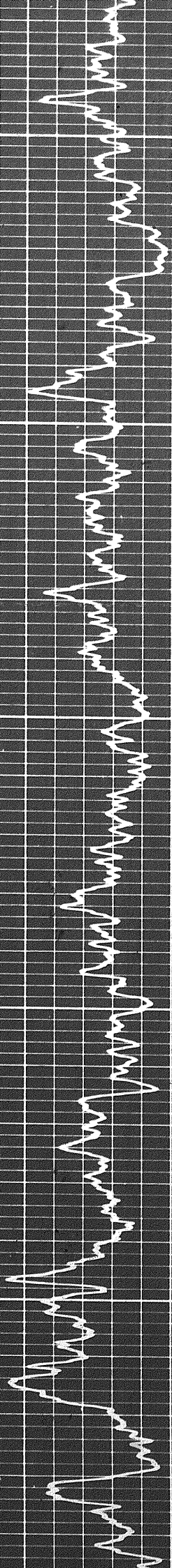


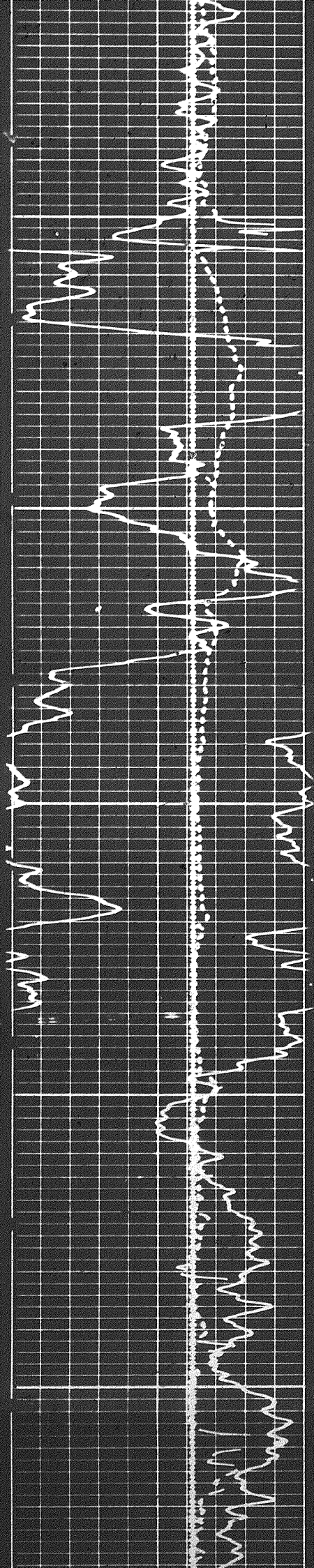
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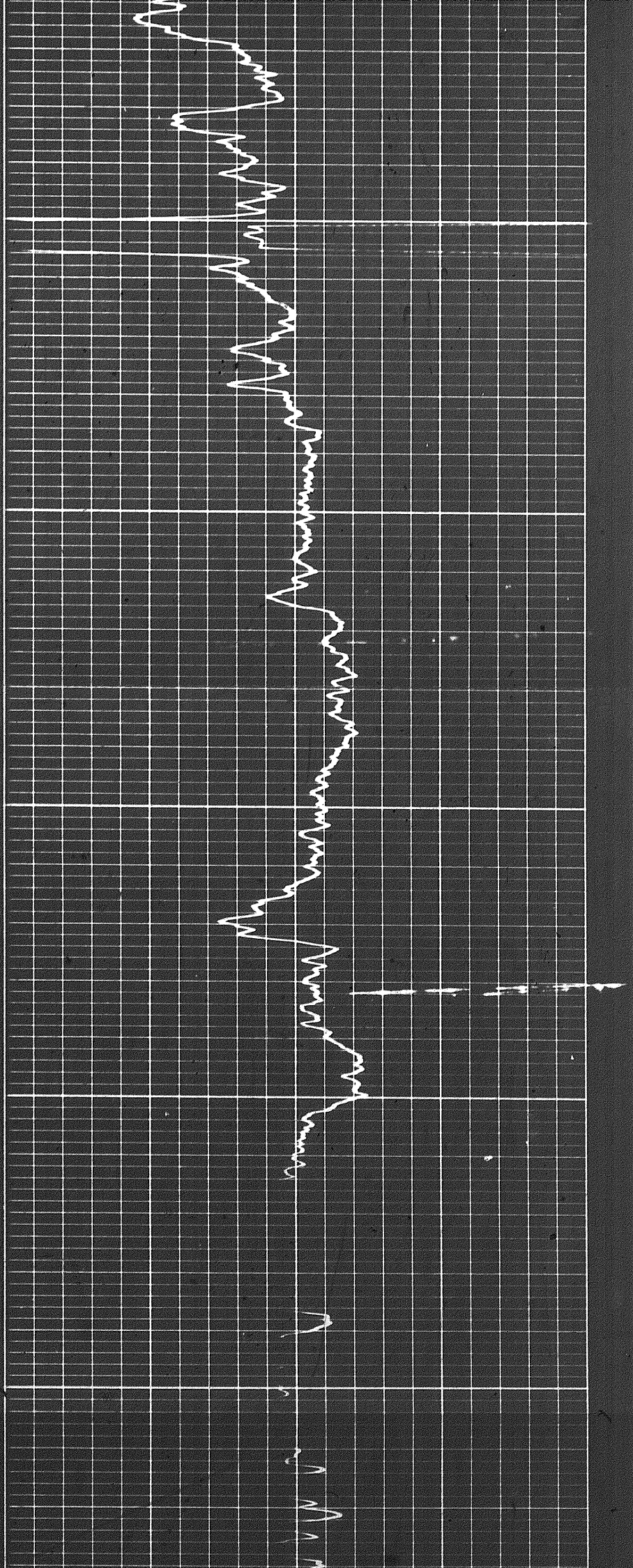


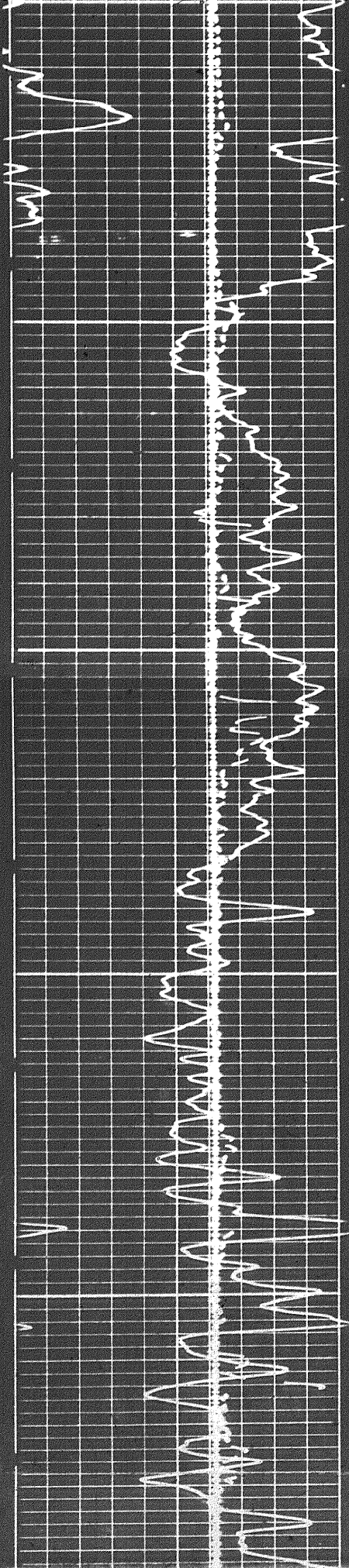


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3300

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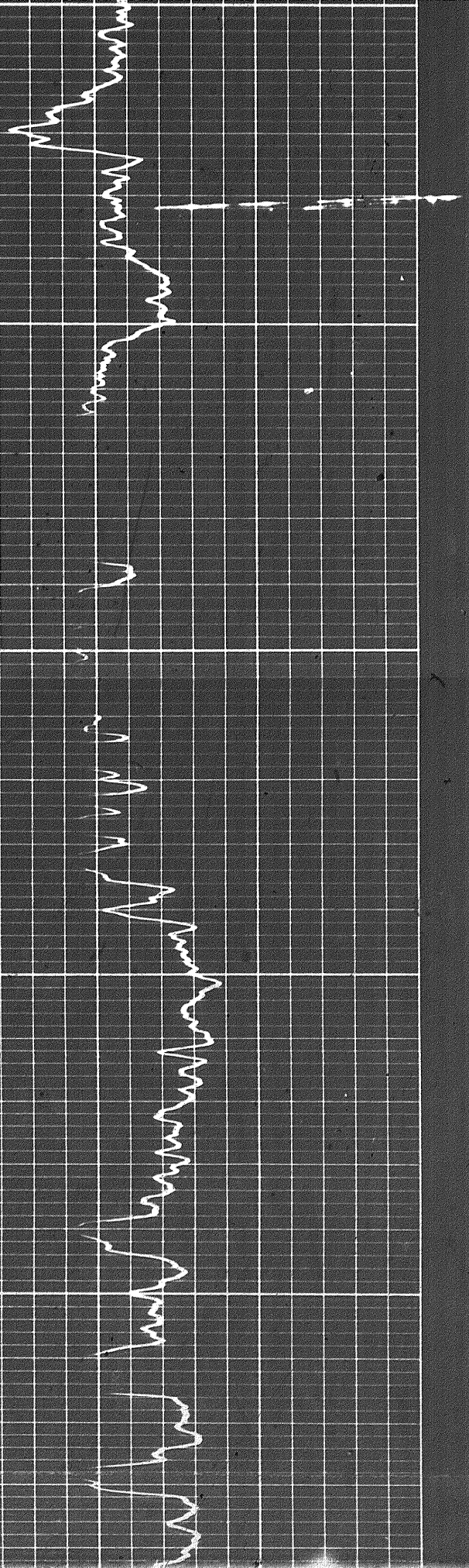


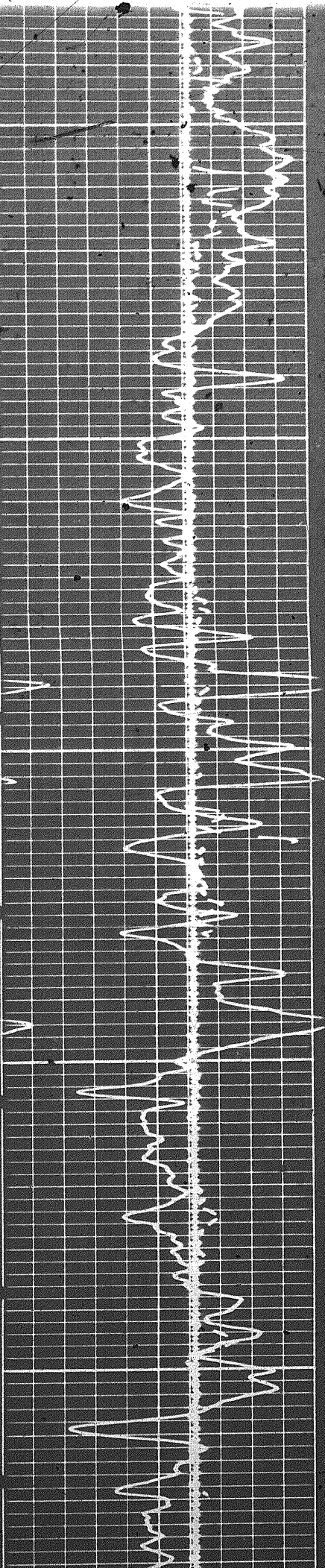


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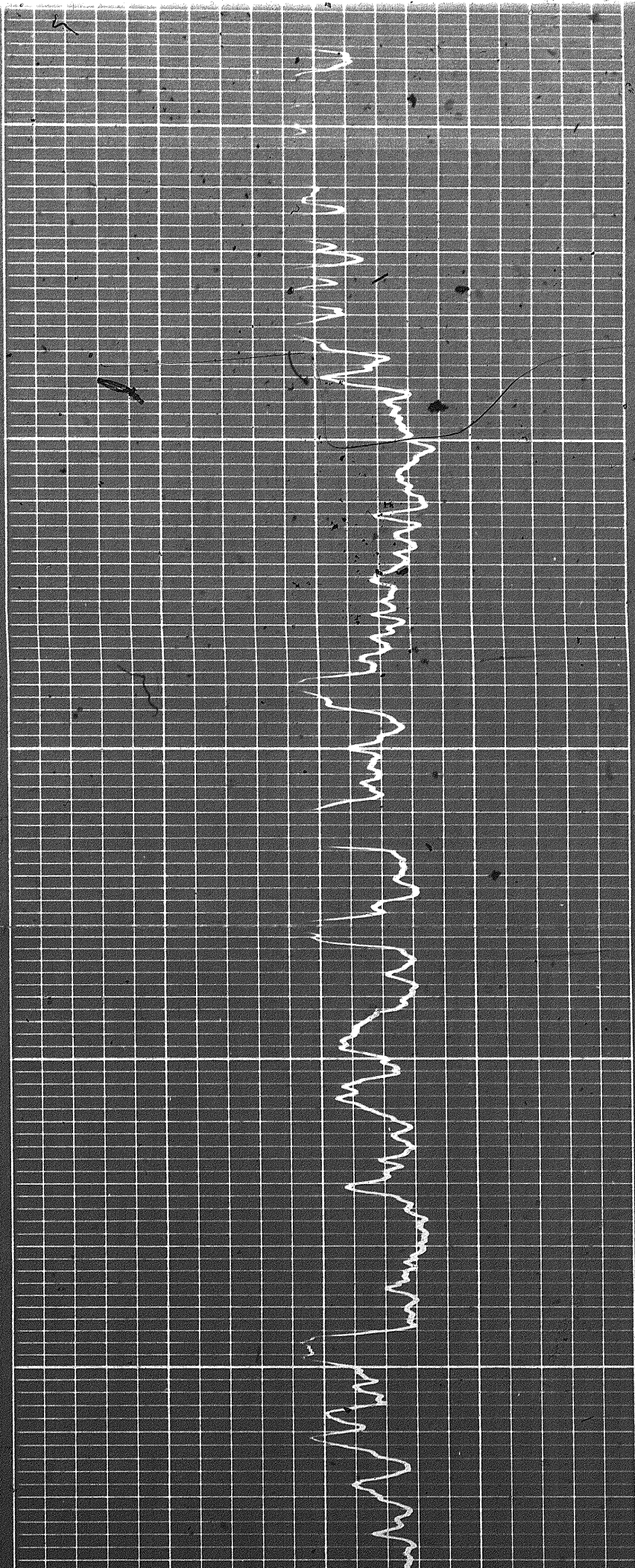


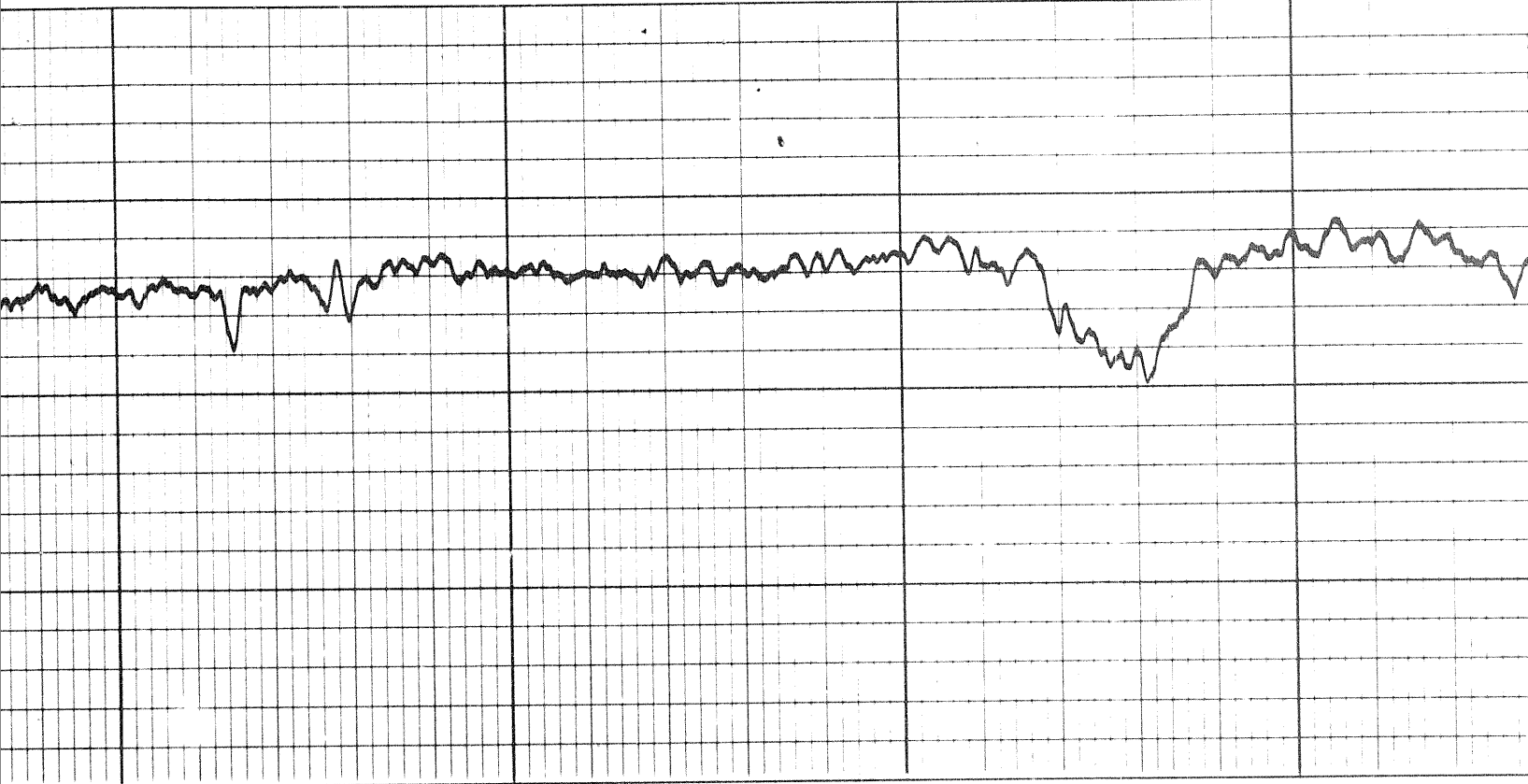


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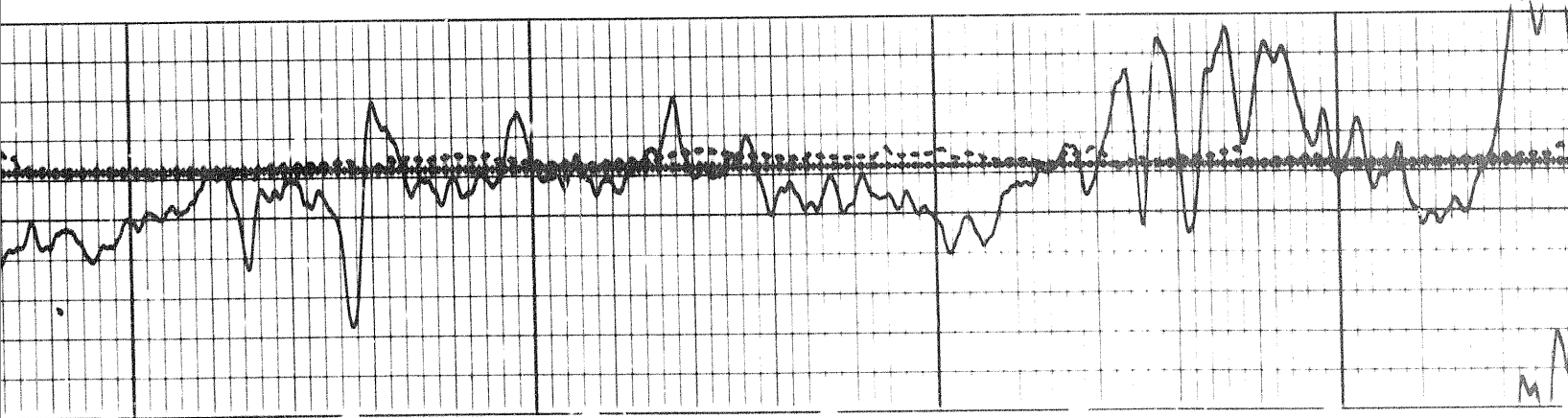
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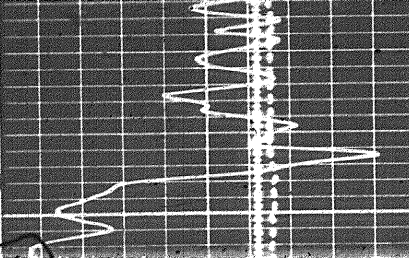


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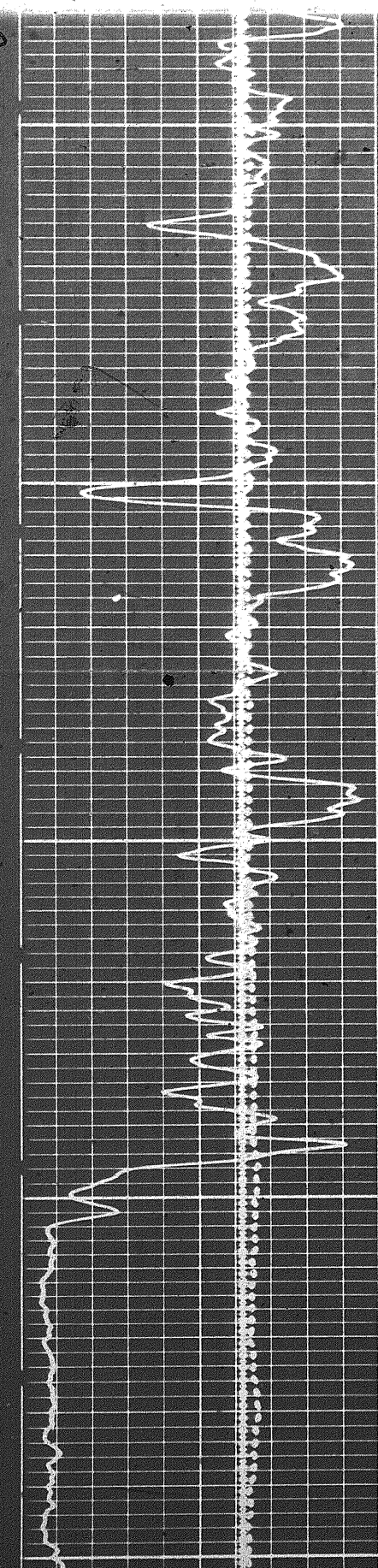
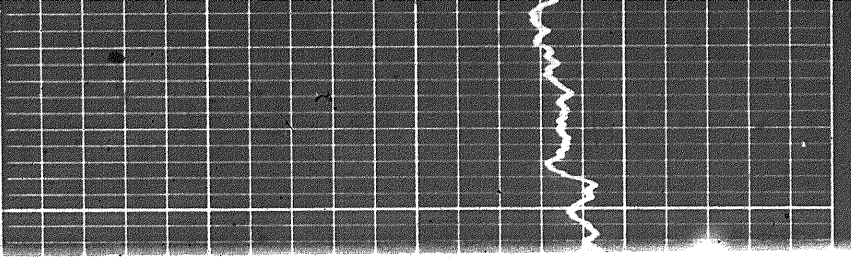
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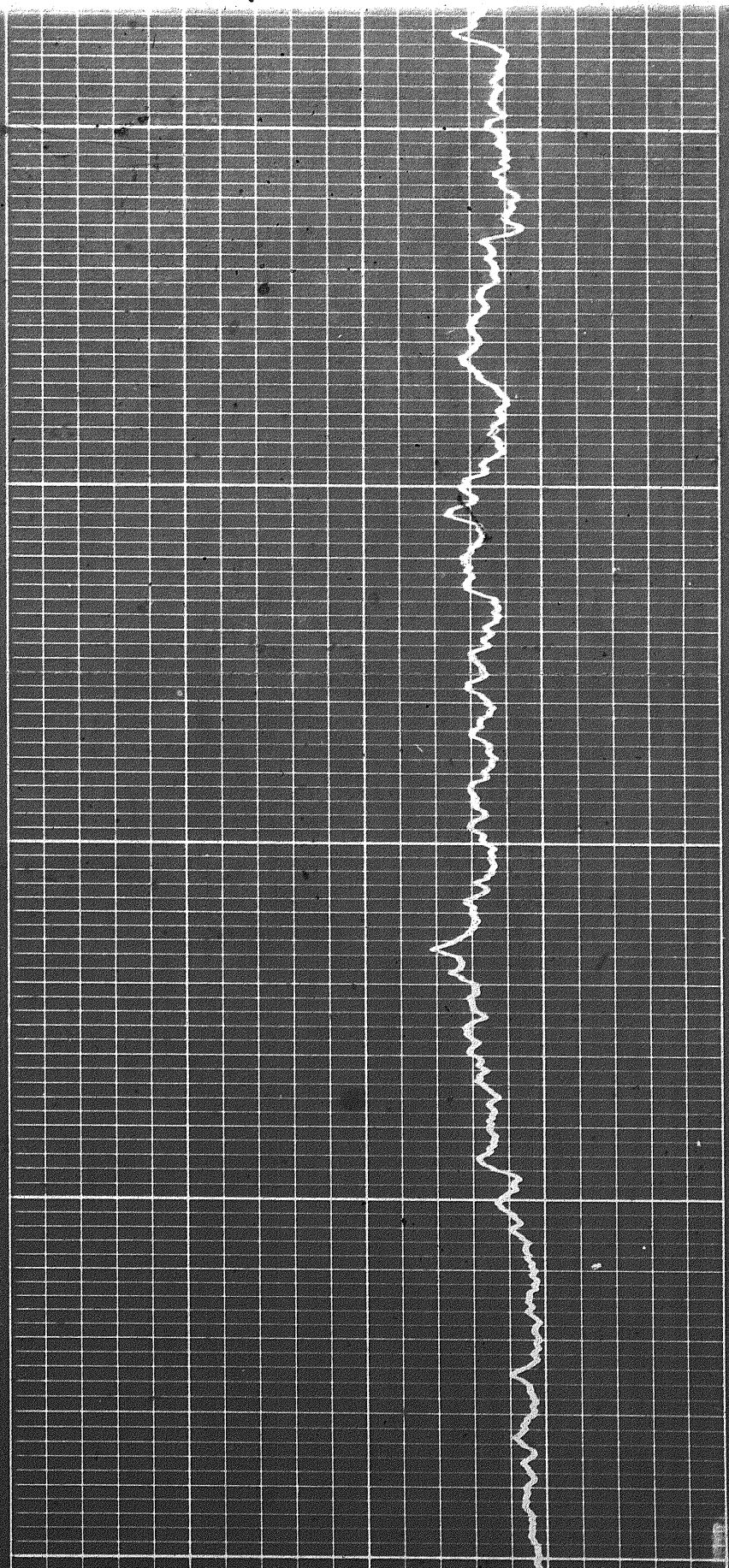
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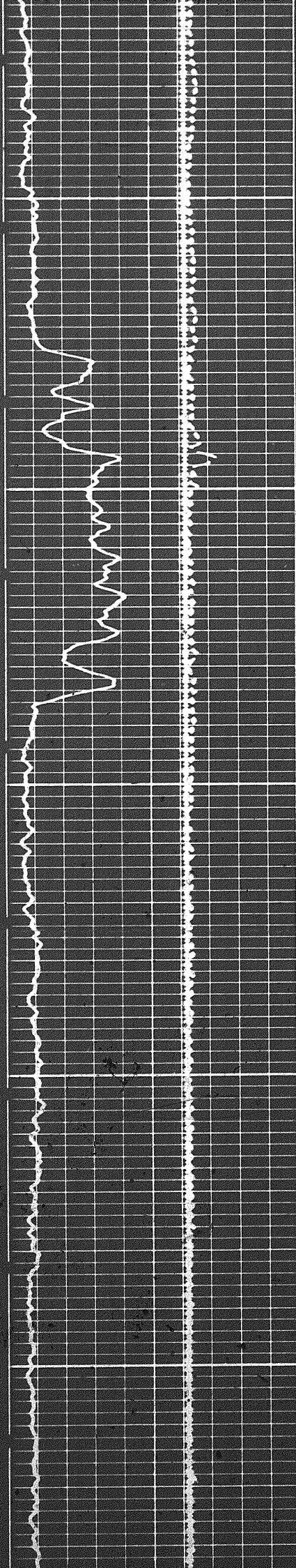


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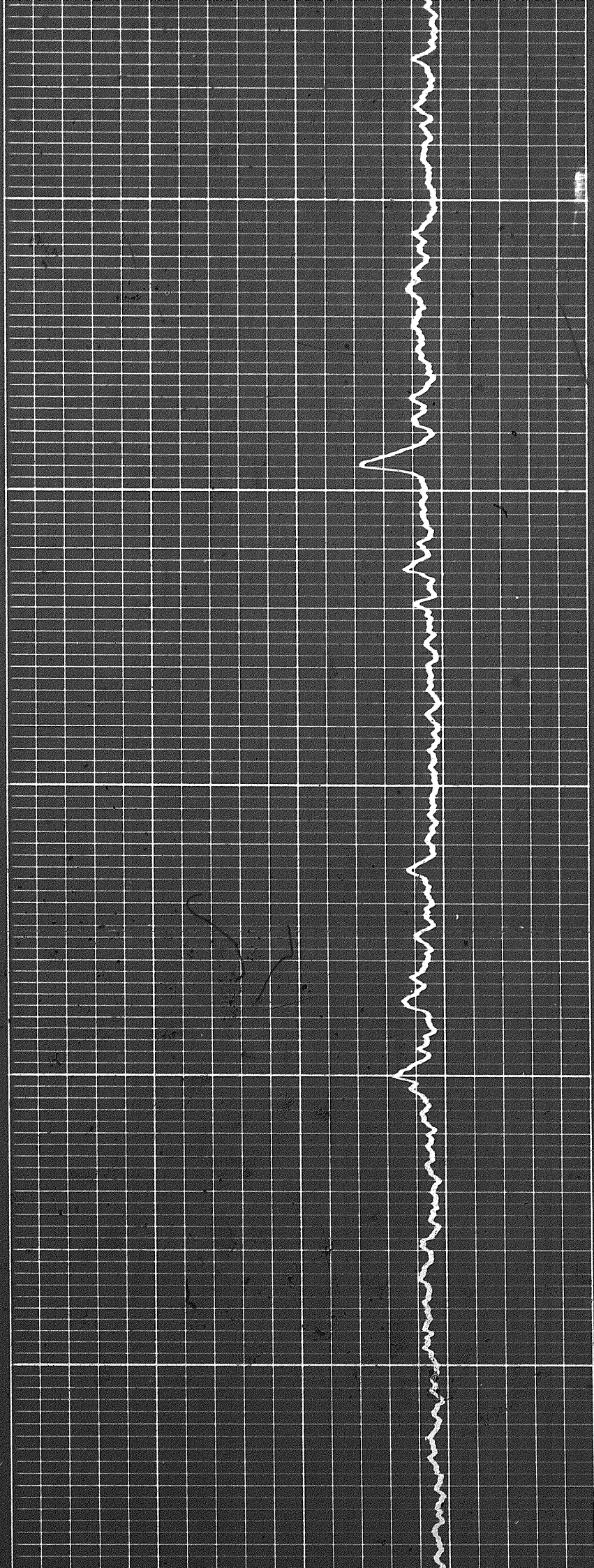
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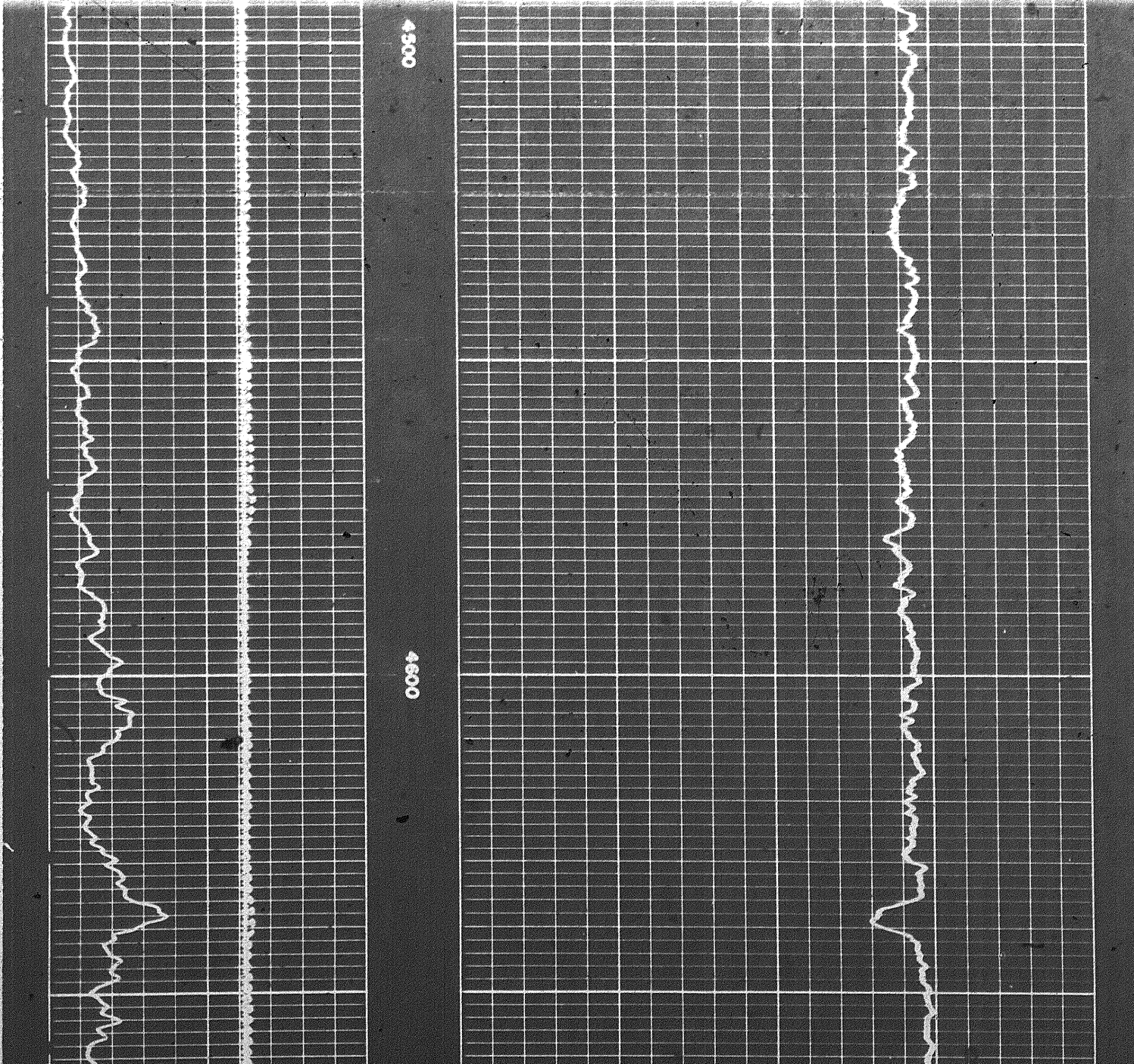
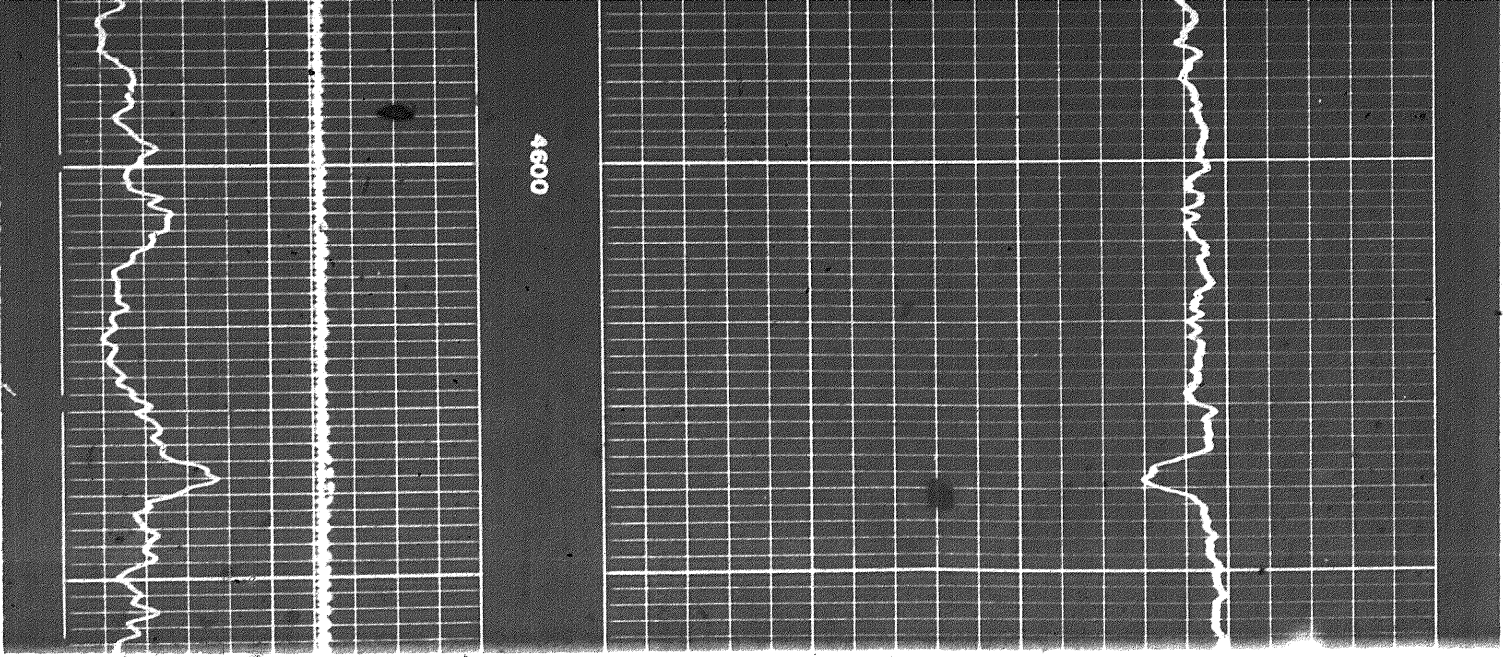
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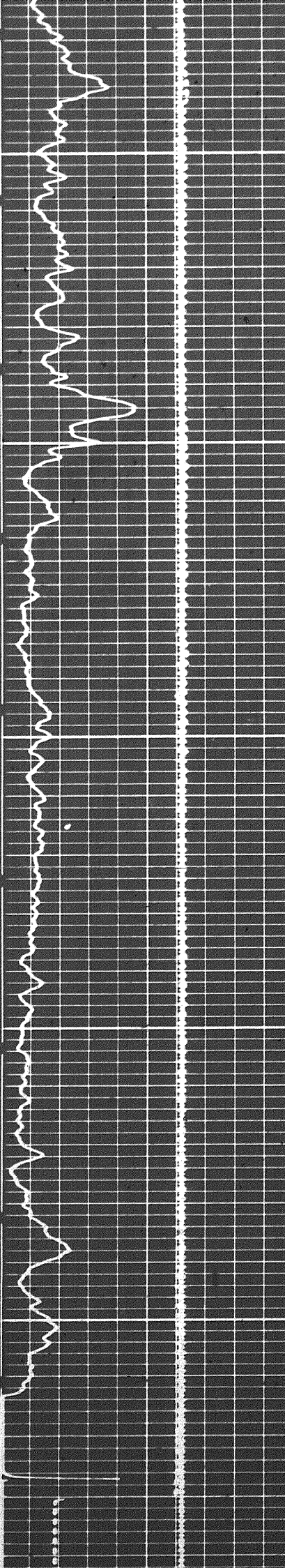
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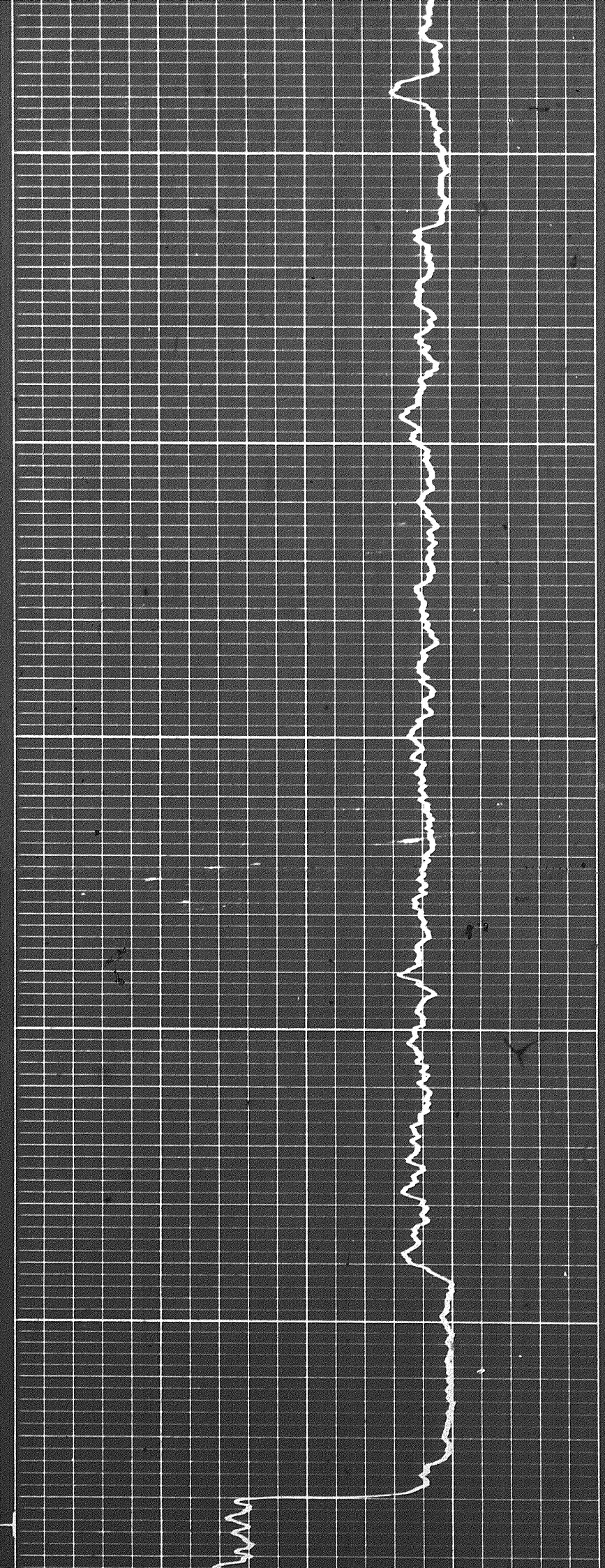
148



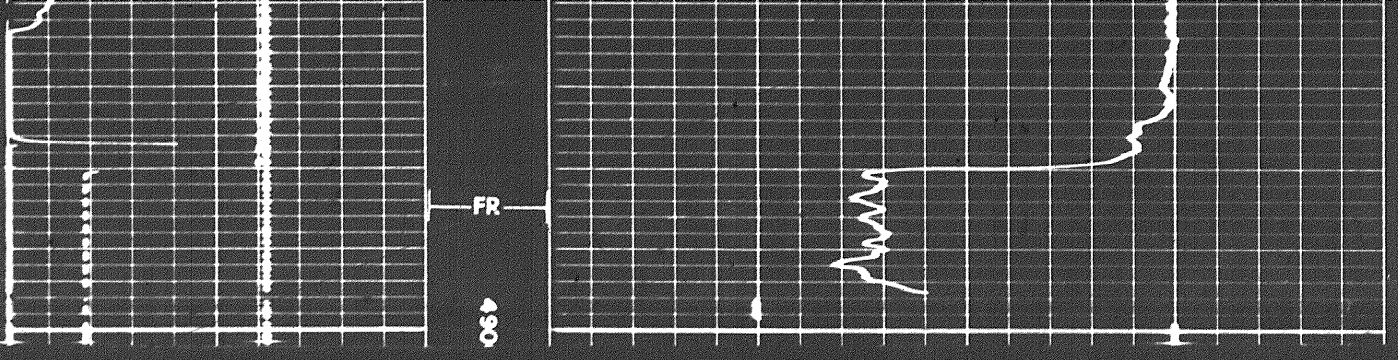
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4800

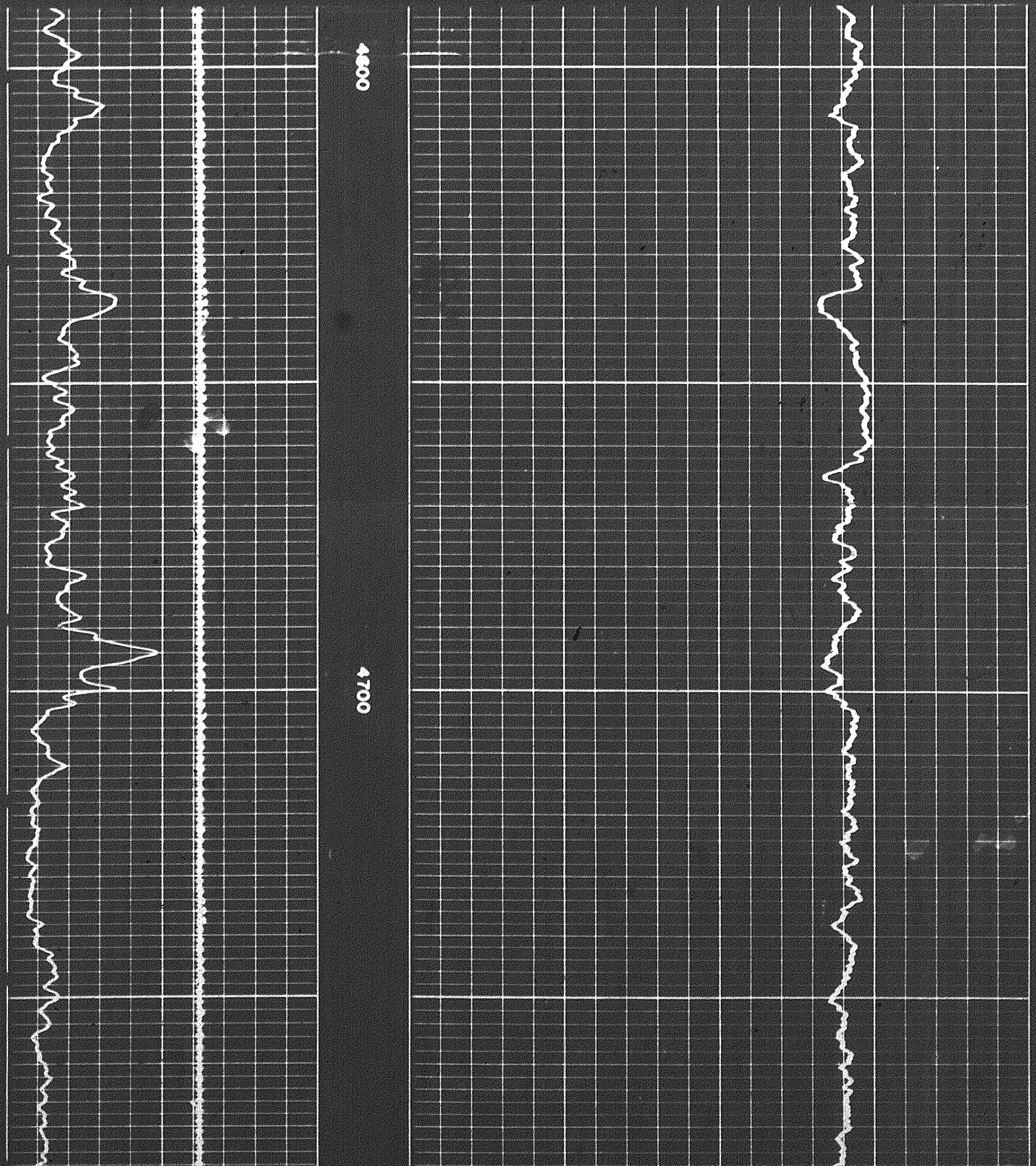
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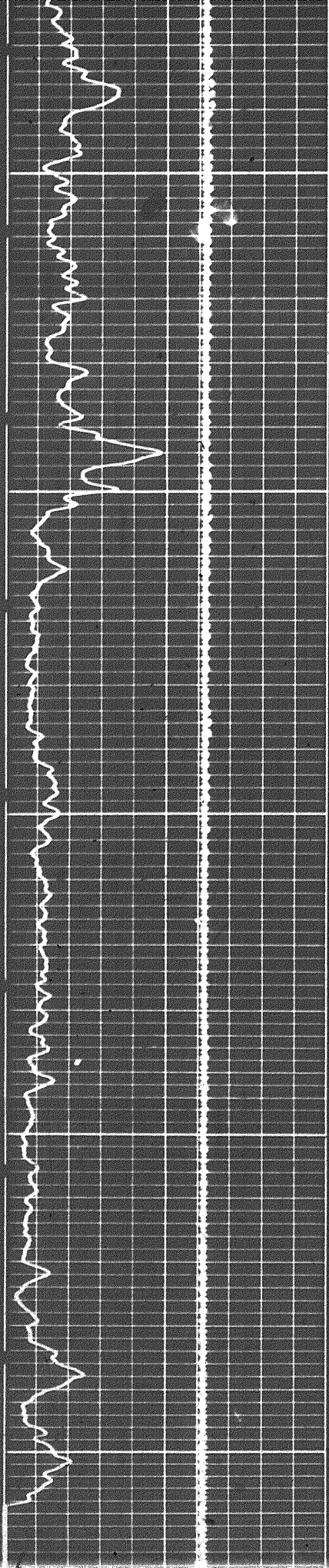


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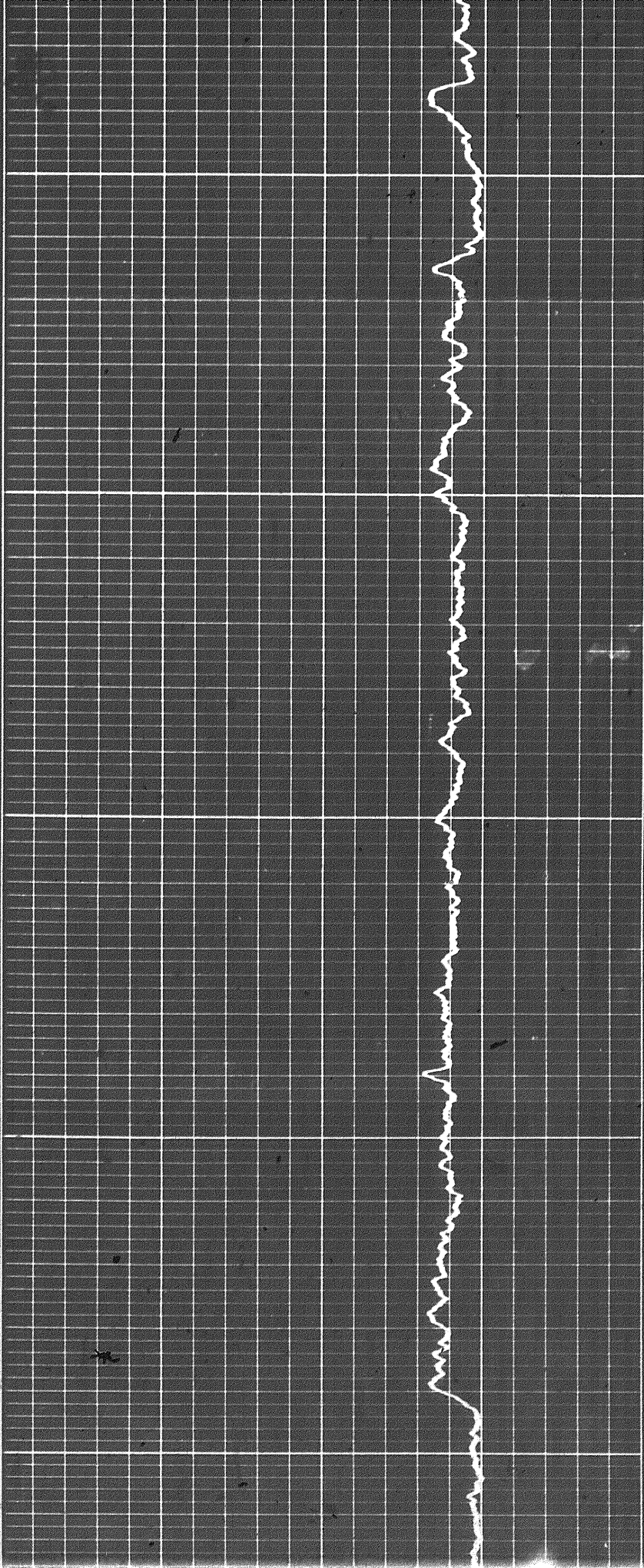
REPEAT SECTION



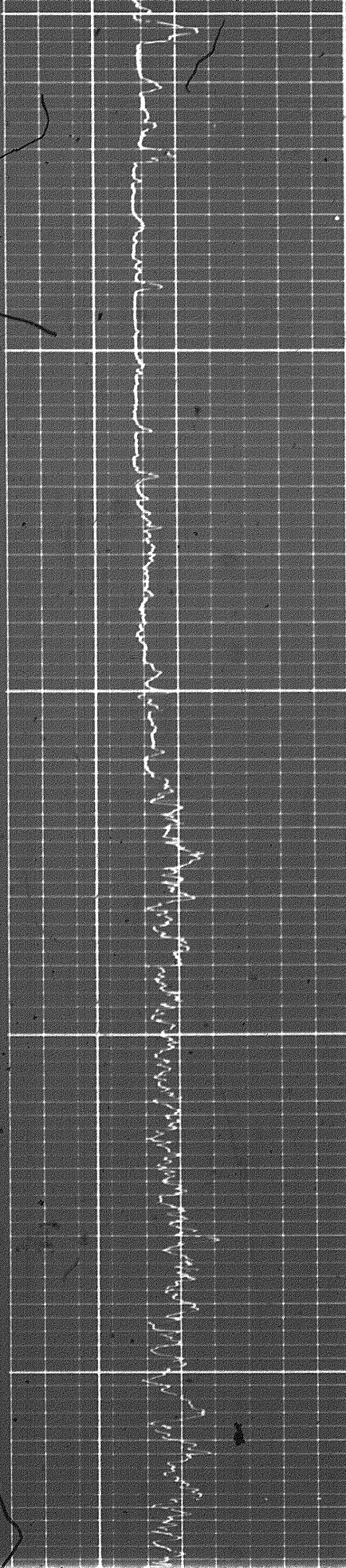


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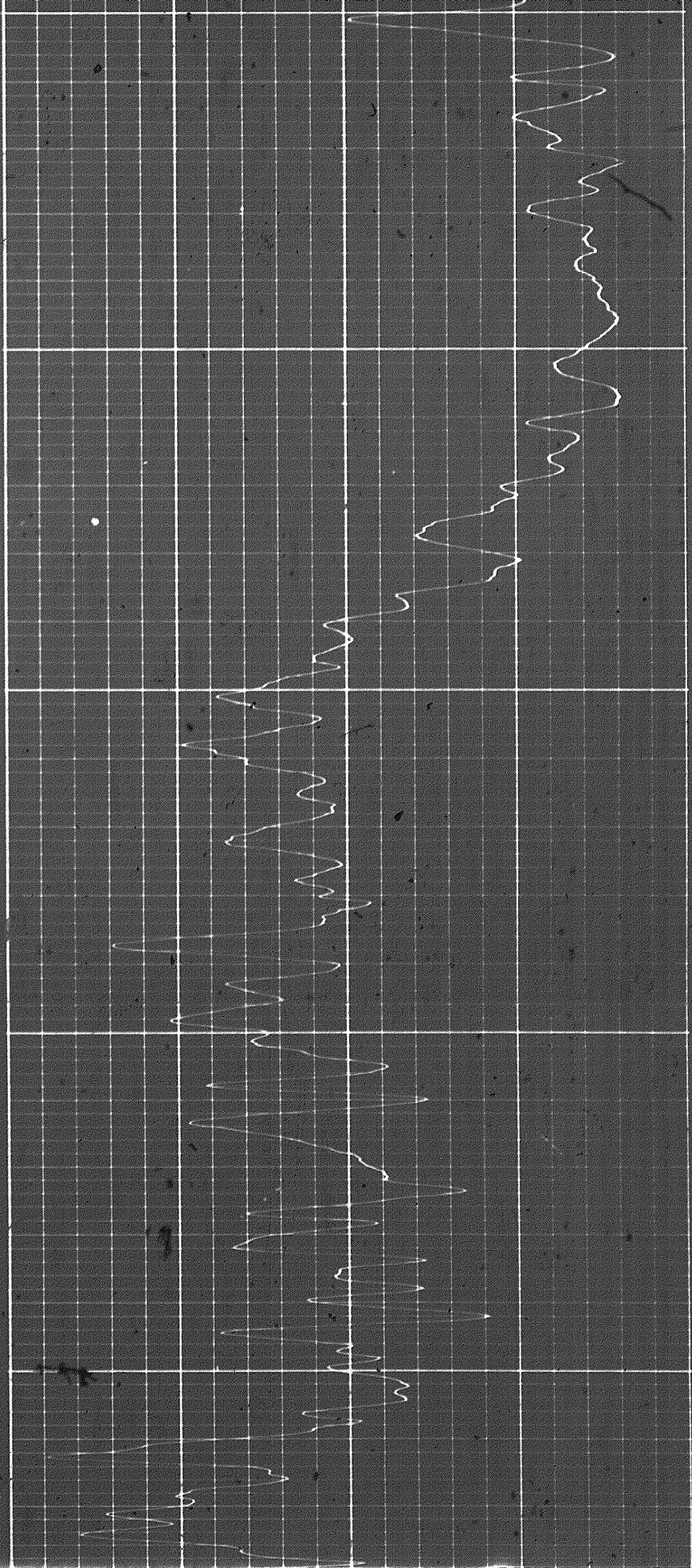


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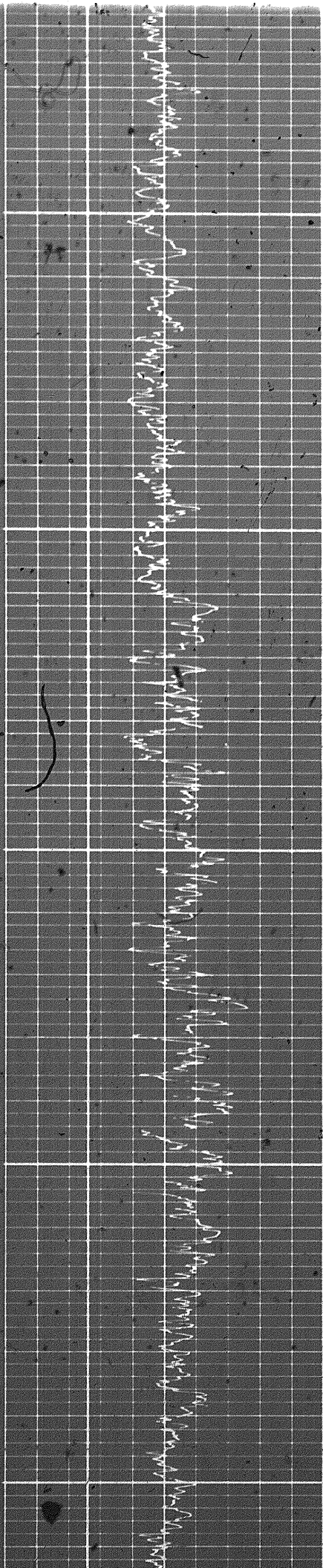


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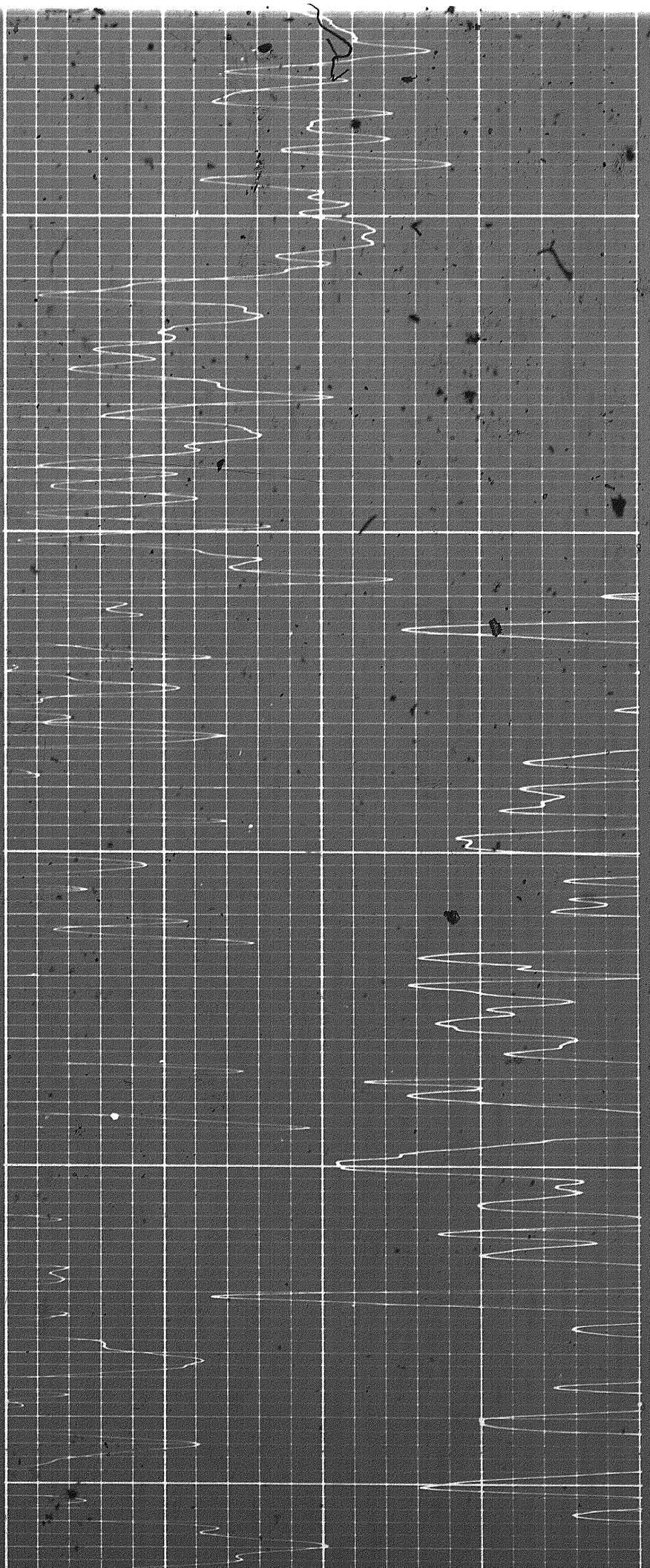


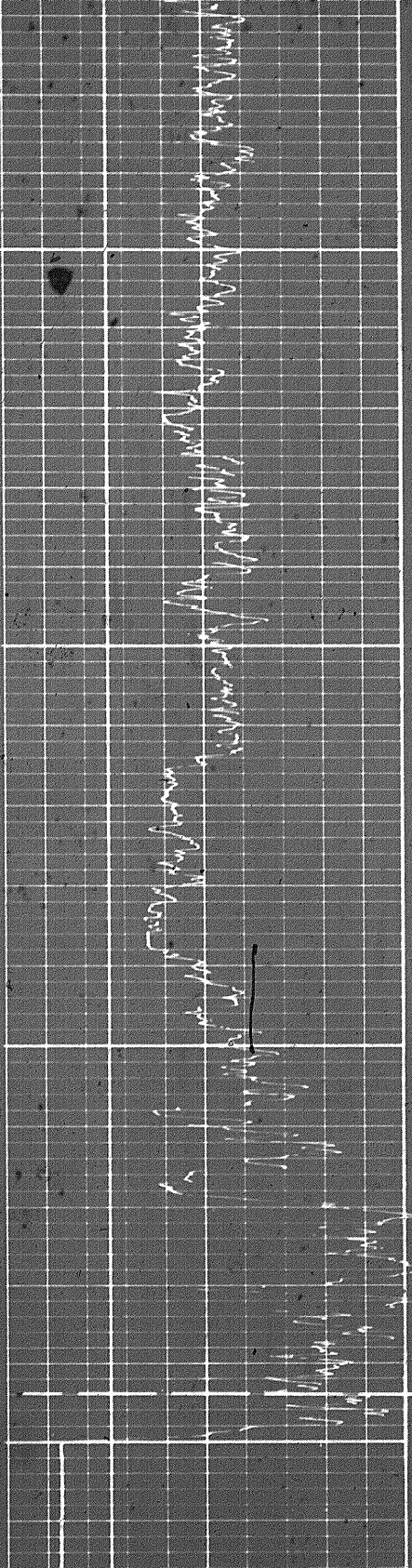
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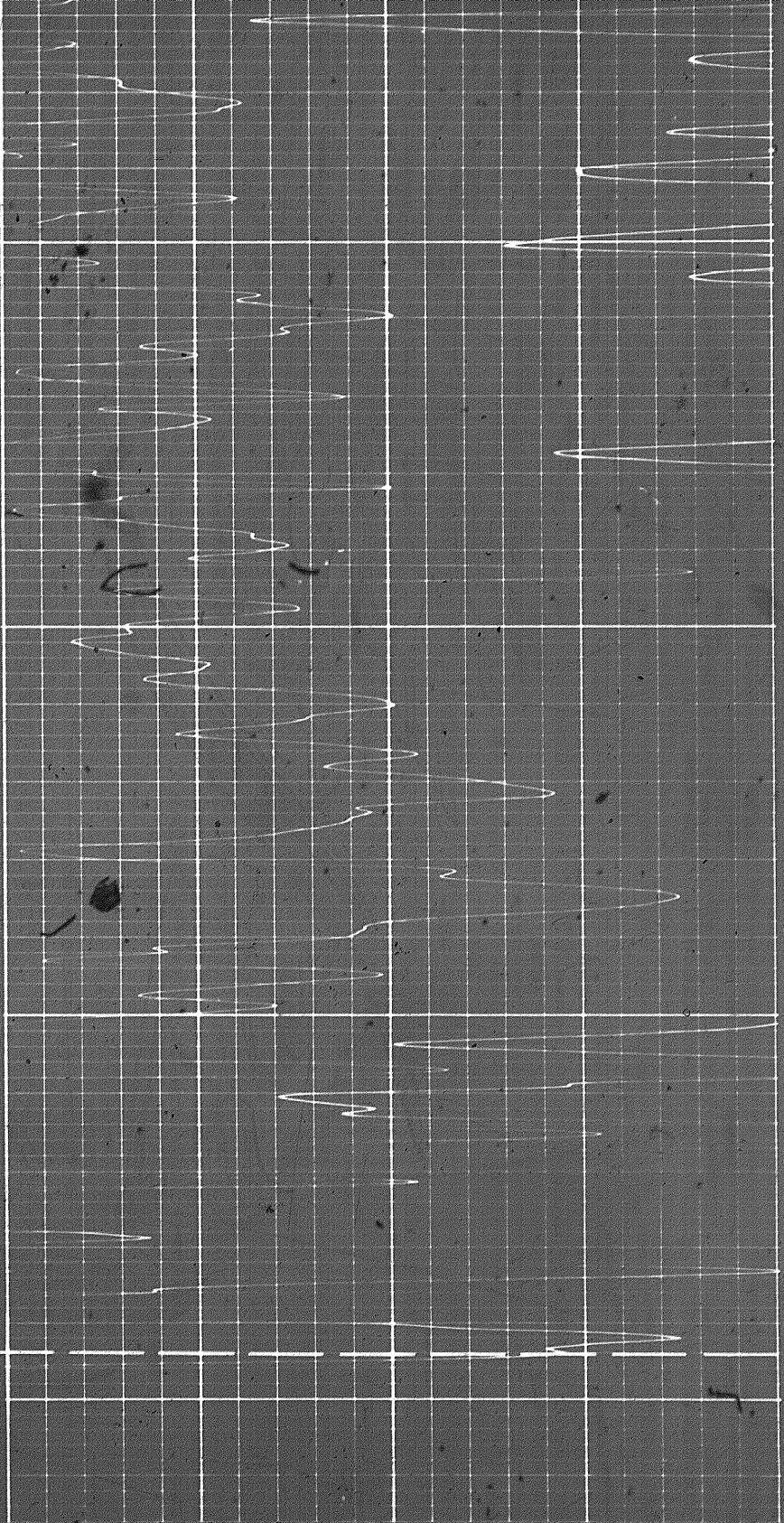
8300





8400

8550



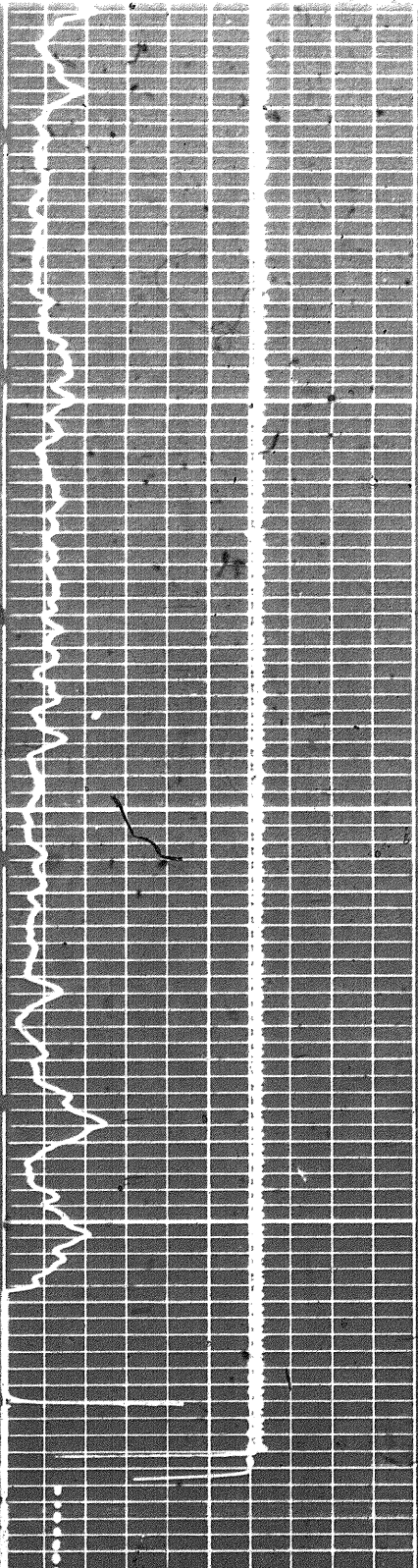
Interval _____ to _____
 Sens _____ TC _____
 Logging Speed _____ ft./min.
 ZERO _____ div. to left

Interval 3350 to 4000
 Sens 300 TC 1
 Logging Speed 40 ft./min.
 ZERO 0 div. to left

0 120
 120 240

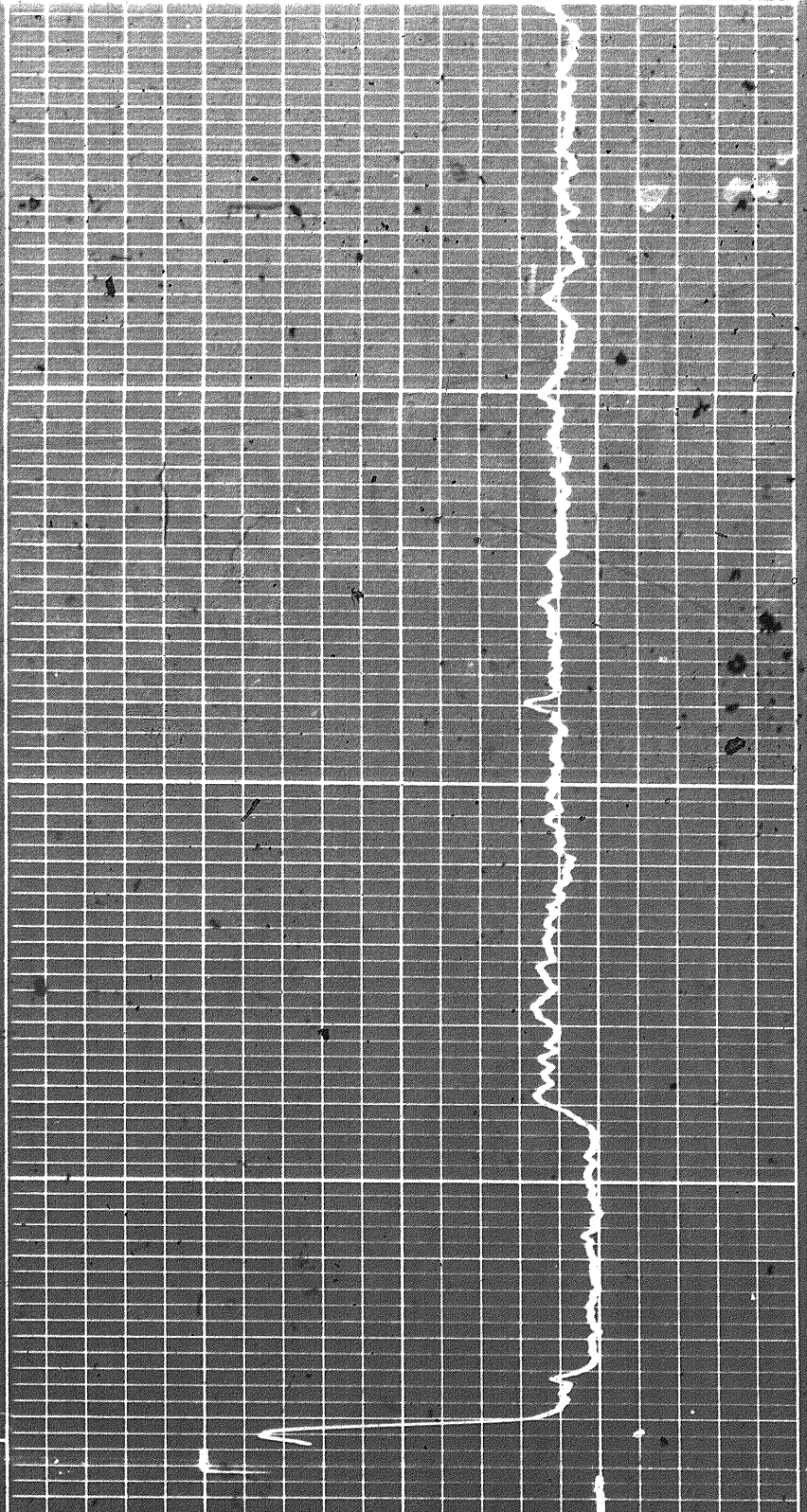
Interval _____ to _____
 Sensitivity _____ Time Constant 2
 Logging Speed _____ ft./min.
 ZERO _____ divisions to right of this line

Interval _____ to _____
 Sensitivity _____ Time Constant 2
 Logging Speed _____ ft./min.
 ZERO _____ divisions to right of this line



0004

FR



Sens.	150	T.C.	2
Zero	0	div. to left	
0		150	
150		300	

GAMMA RAY
API UNITS

peaks →

Sens. 150 T.C. 2
 Zero 0 div. to left
 0 150
 150 300

GAMMA RAY
 API UNITS

Speed in FPM

7 8 9 10 11 12 13 14 15

30 20 10 0 -10
 LIMESTONE

CALIPER
 hole diameter in inches

DEPTH

POROSITY (%)

DETAIL LOG
 5' = 100'

RUN 2

CALIPER
 hole diameter in inches

DEPTH

POROSITY (%)

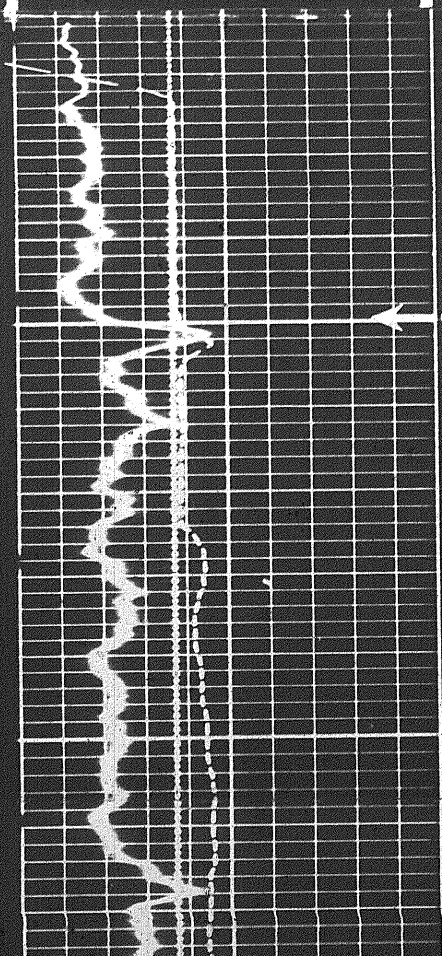
Speed in FPM

6 7 8 9 10 11 12 13 14

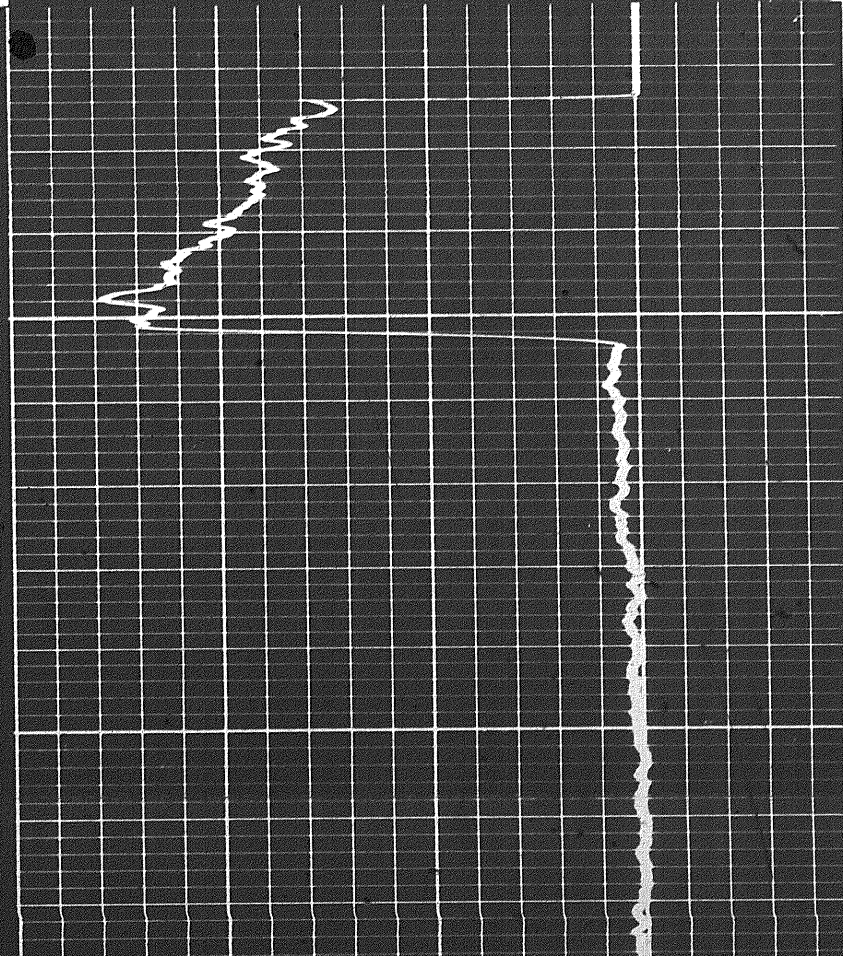
30 20 10 0 -10
 LIMESTONE

GAMMA RAY
 API UNITS

Sens. 100 T.C. 2
 Zero 0 div. to left
 0 100
 100 200

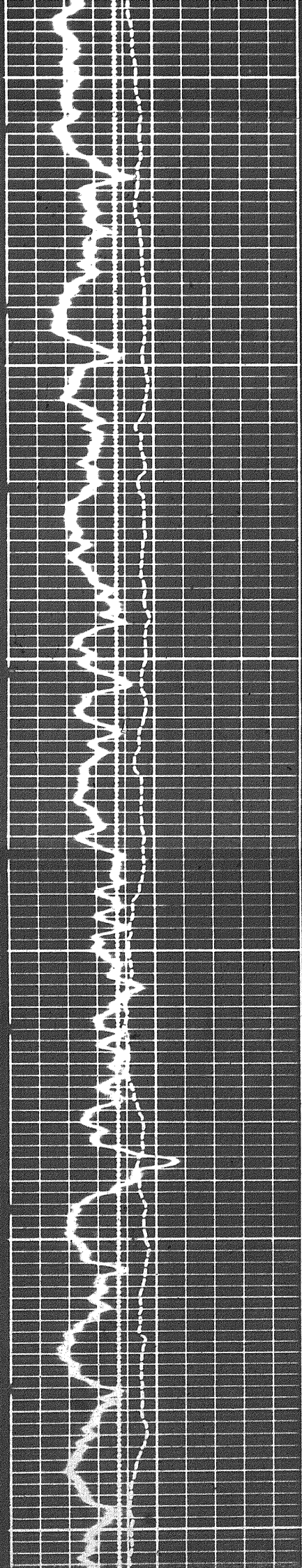


4980
 Casing



15.8

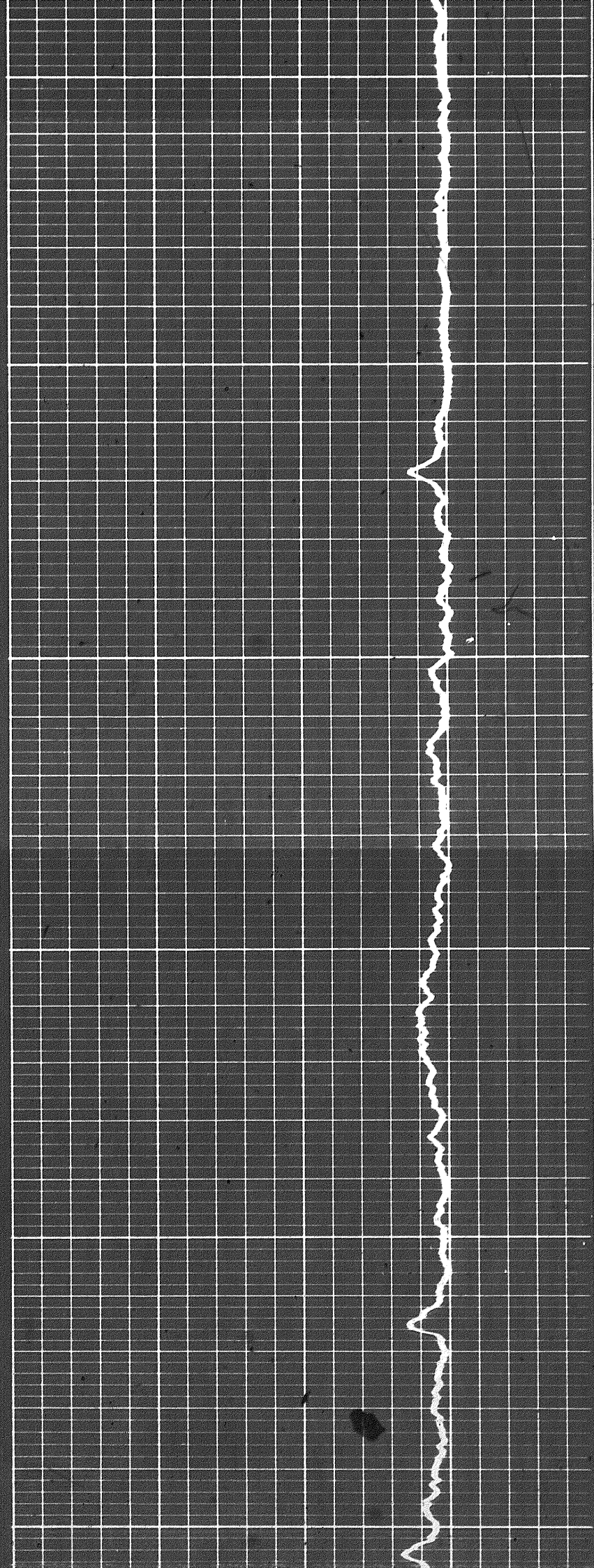
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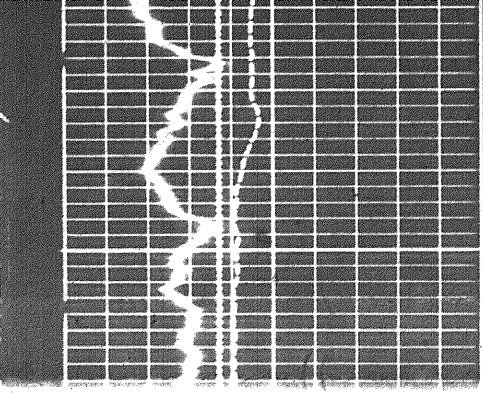


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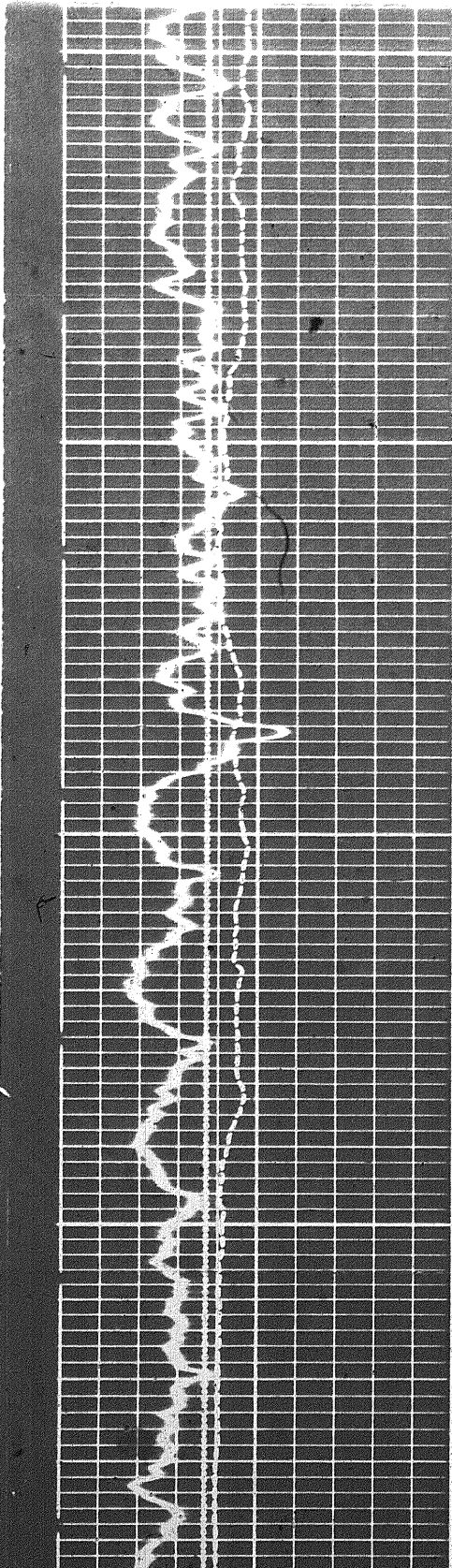
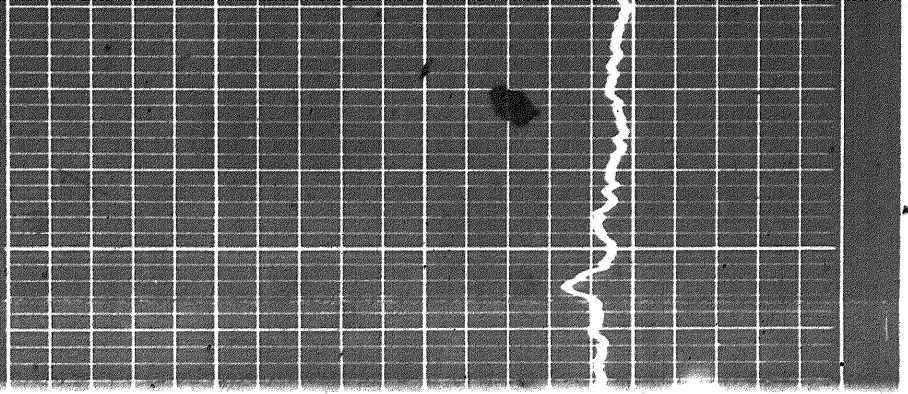
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5200

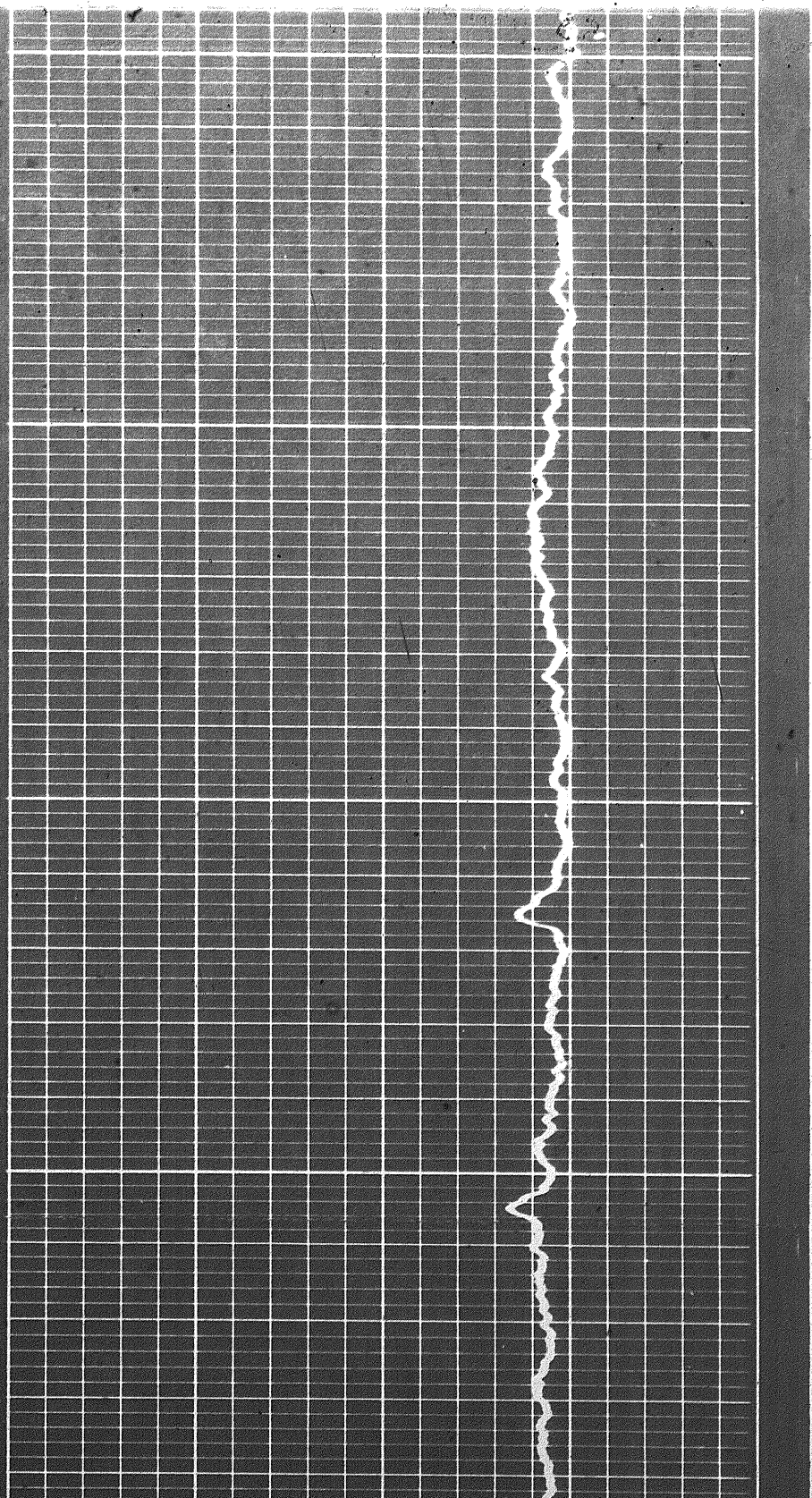




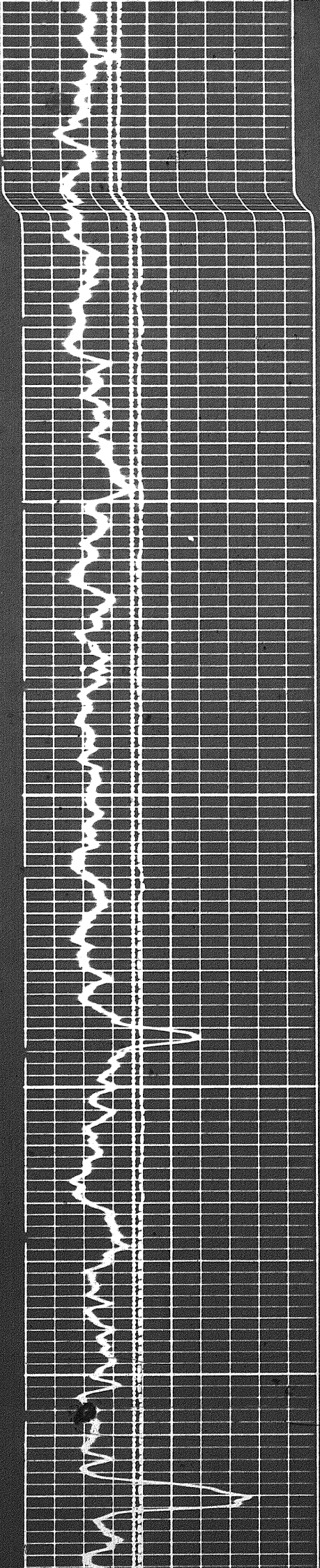
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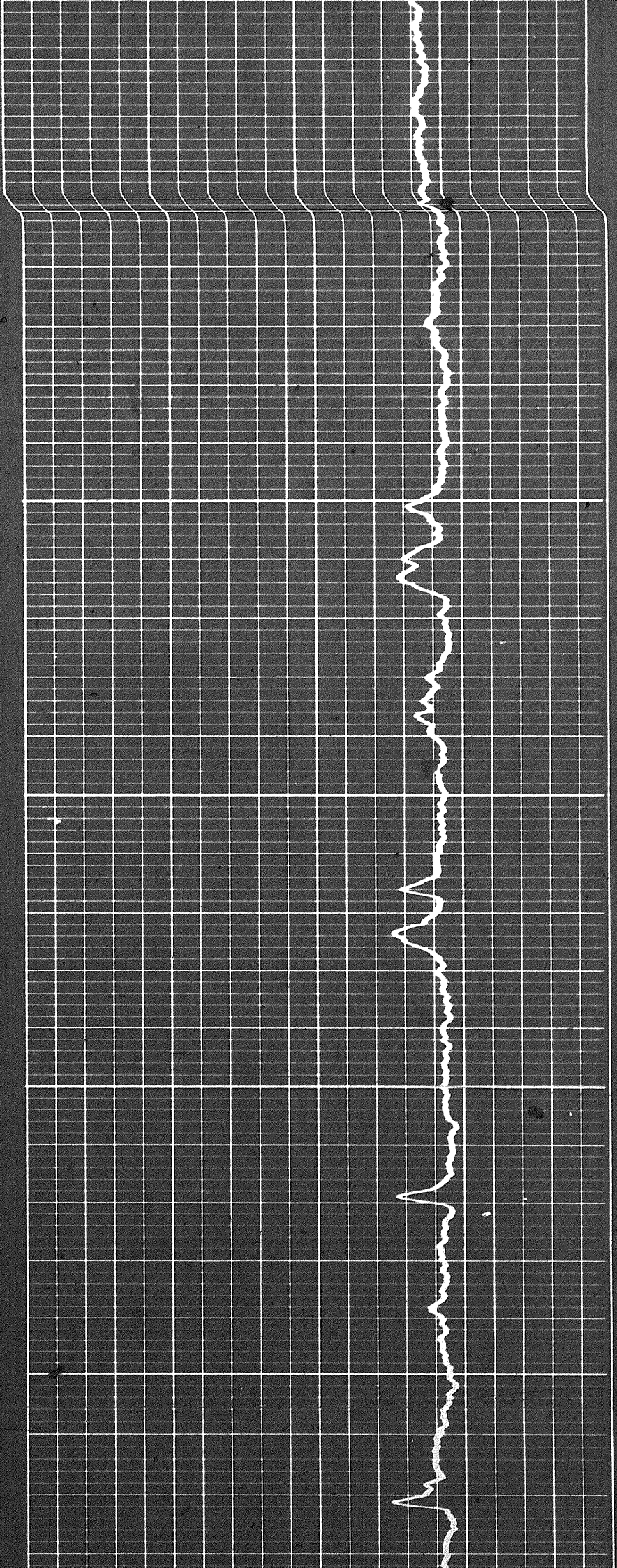


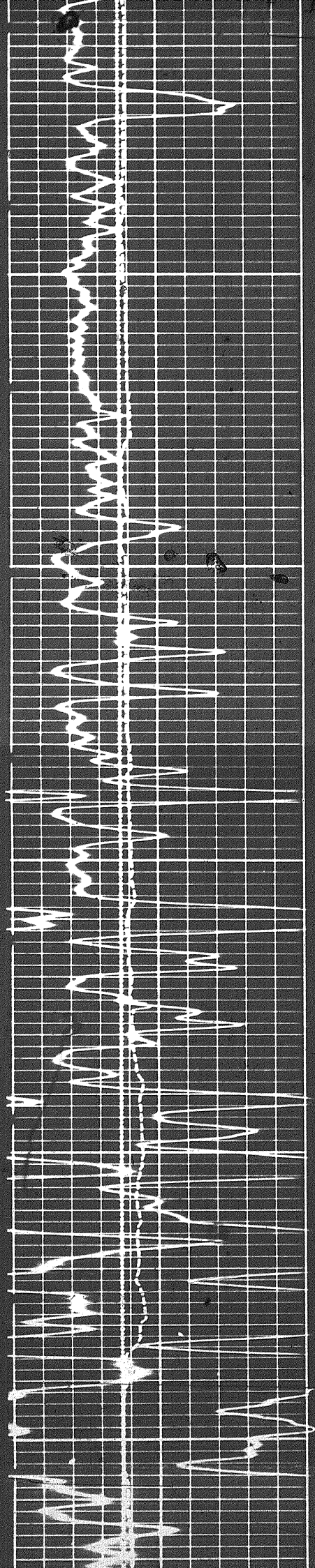
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5300

5400

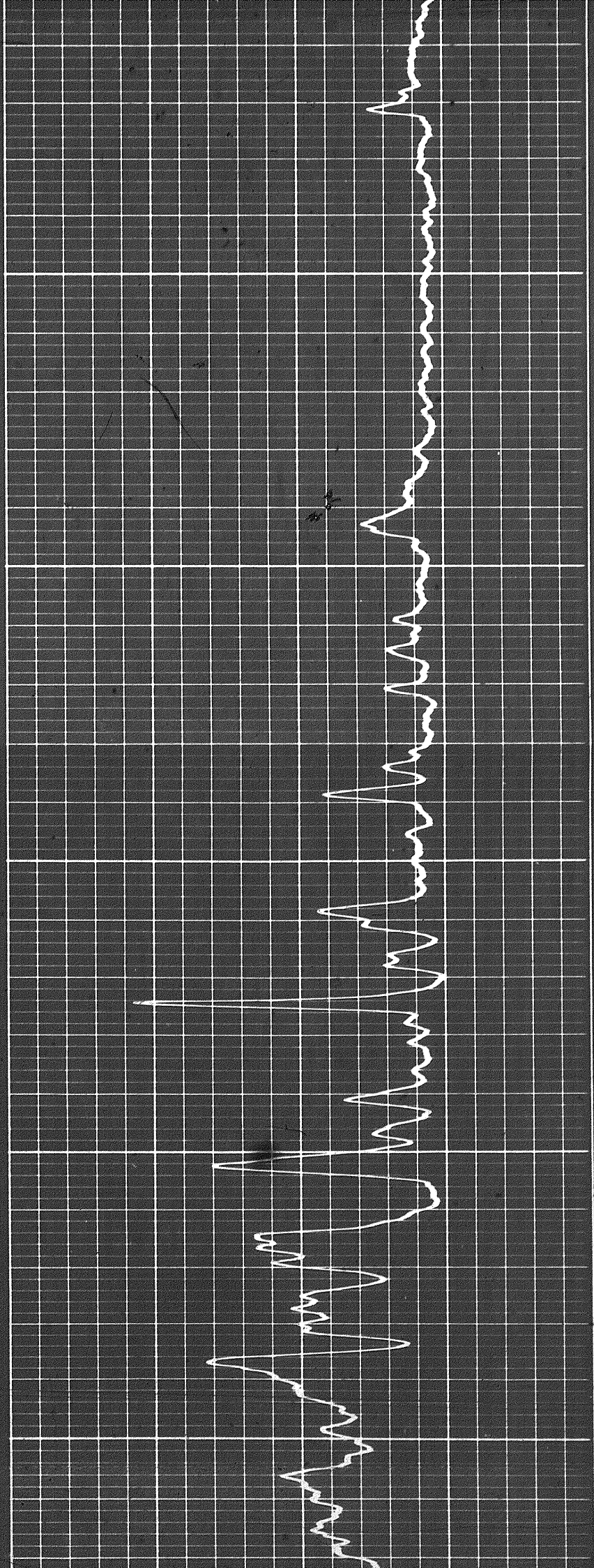


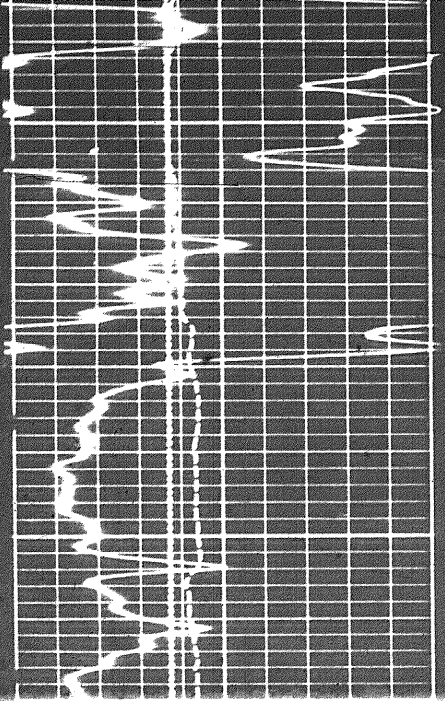


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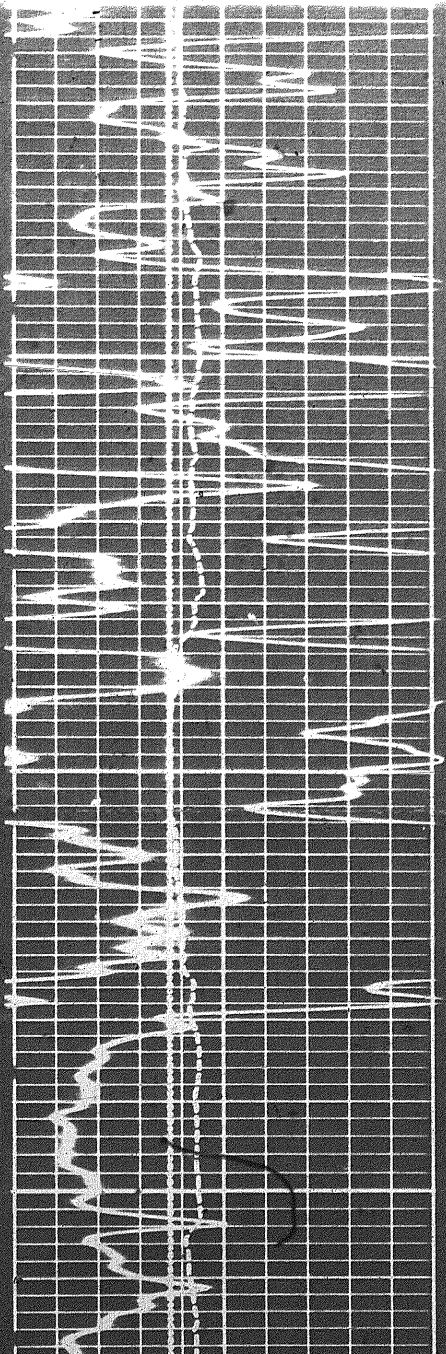
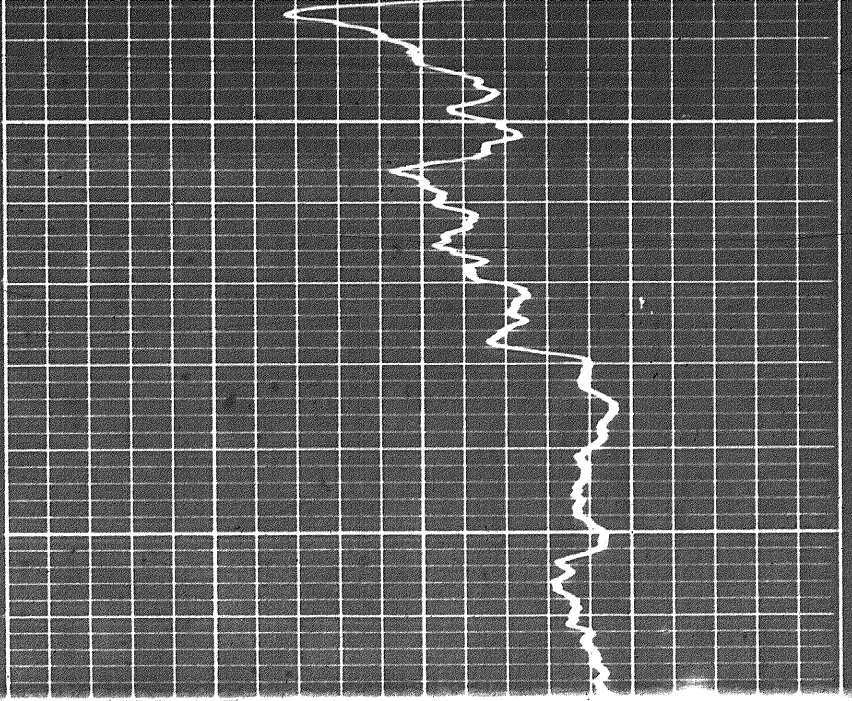
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5700

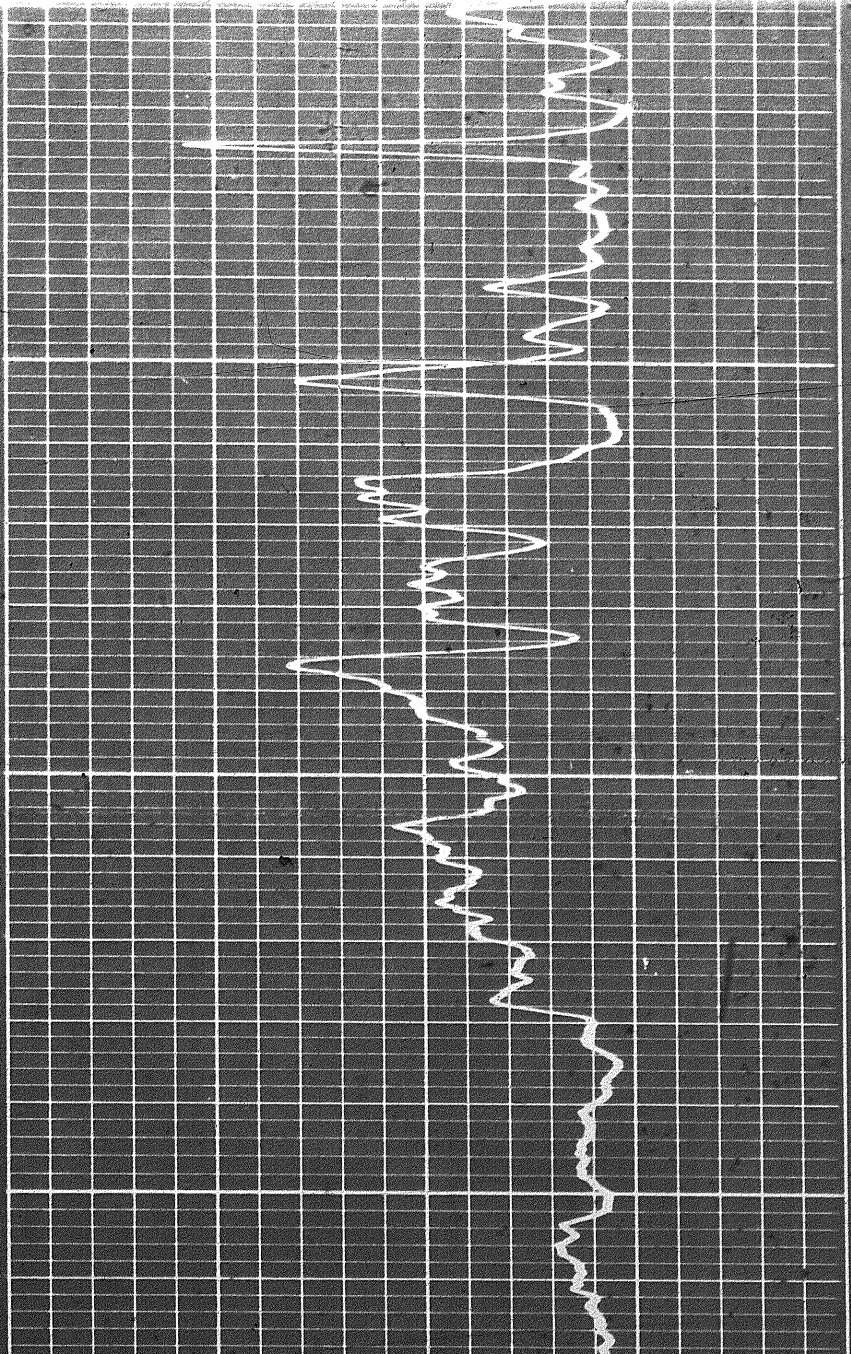




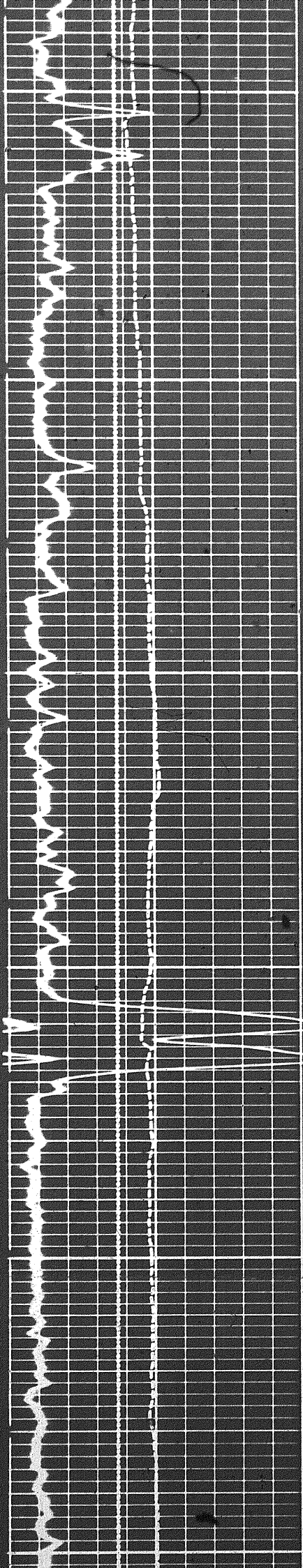
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5700



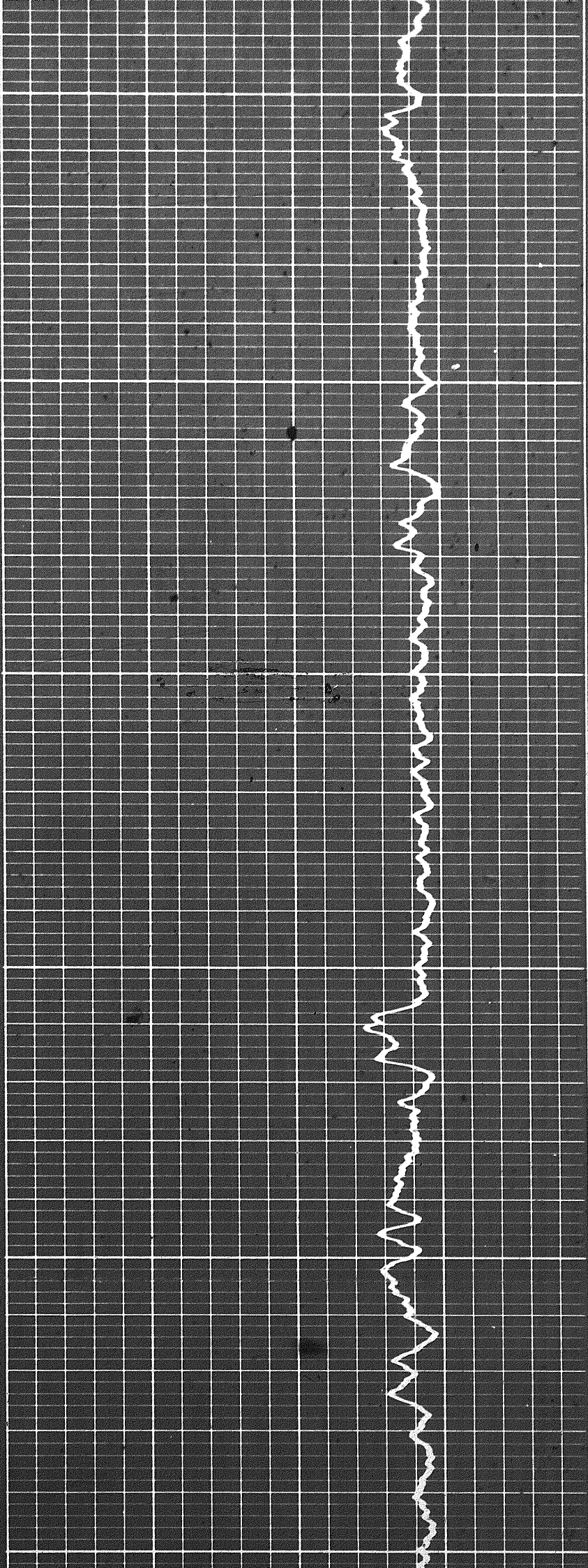
138



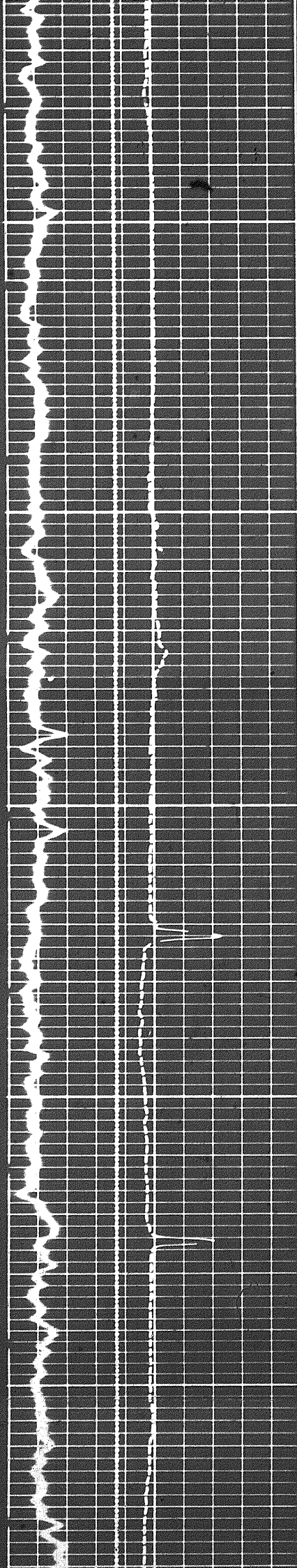
5900

5900

6000



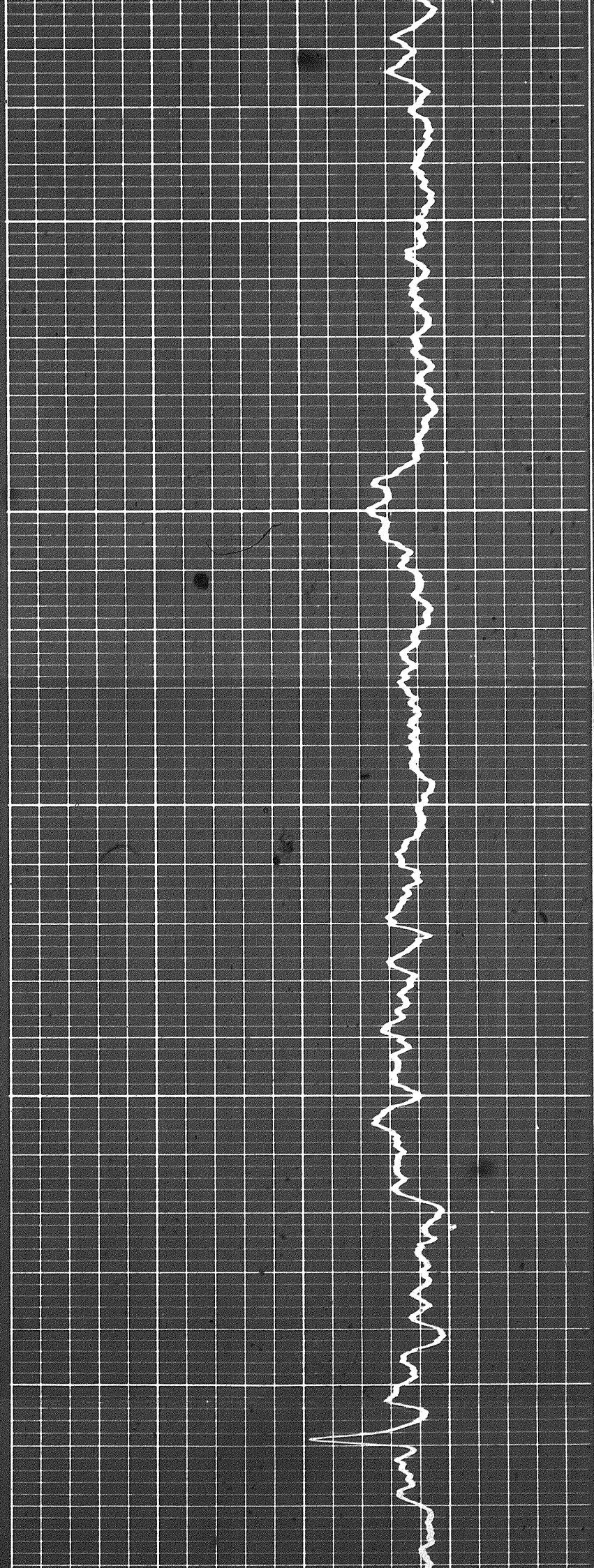
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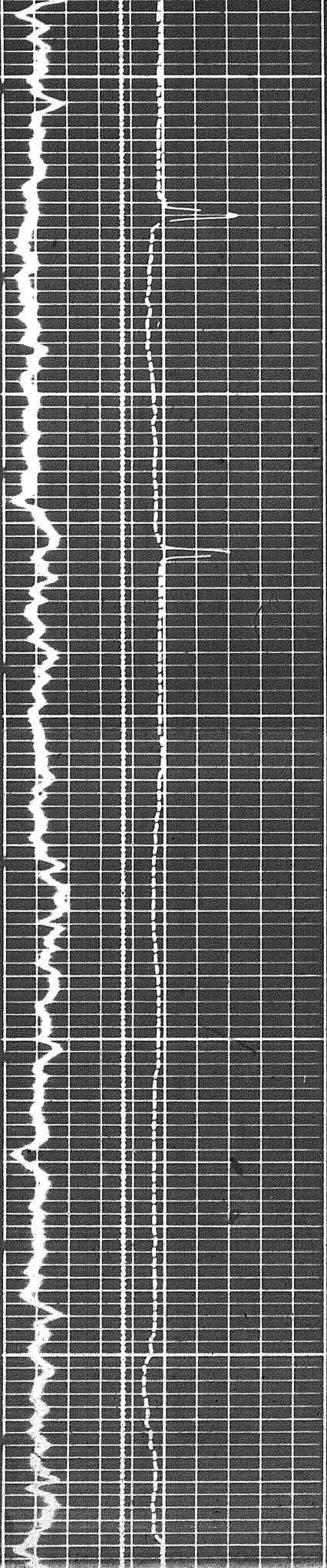


6000

6100

6200

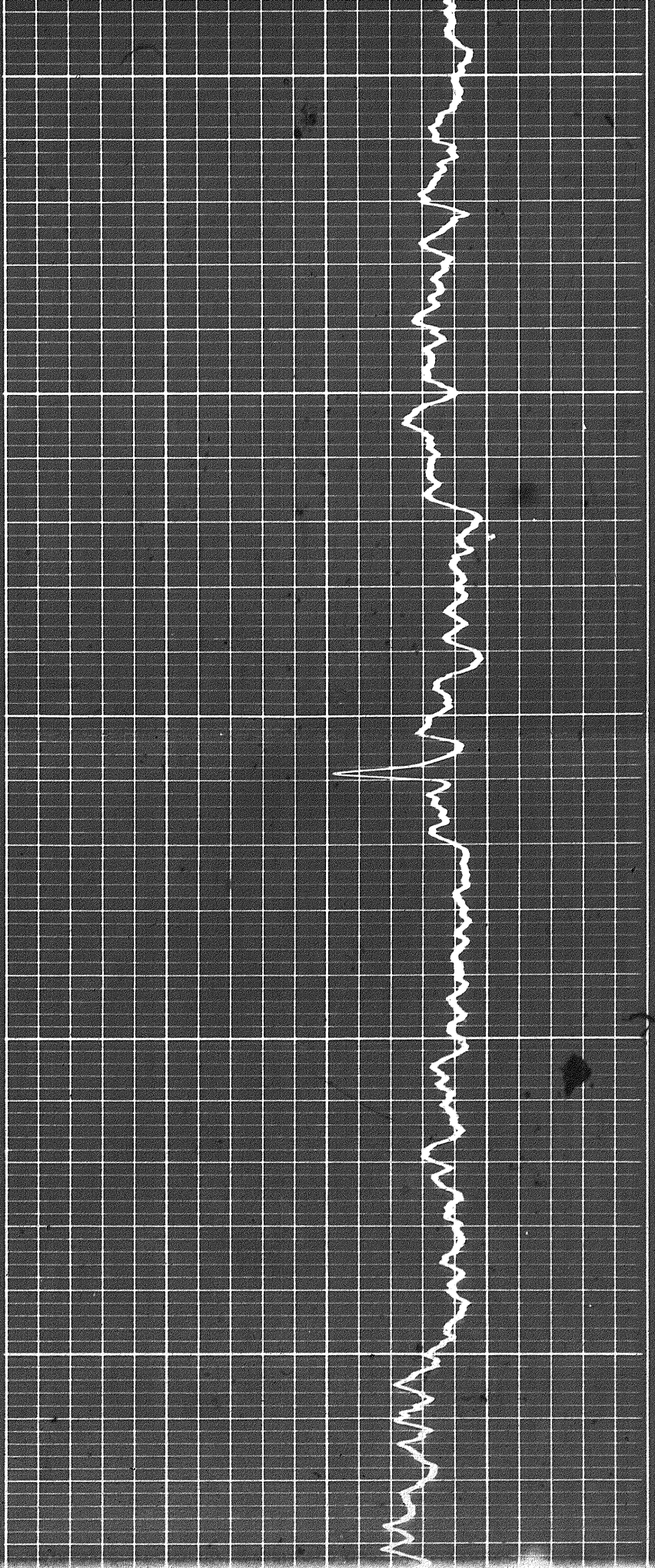




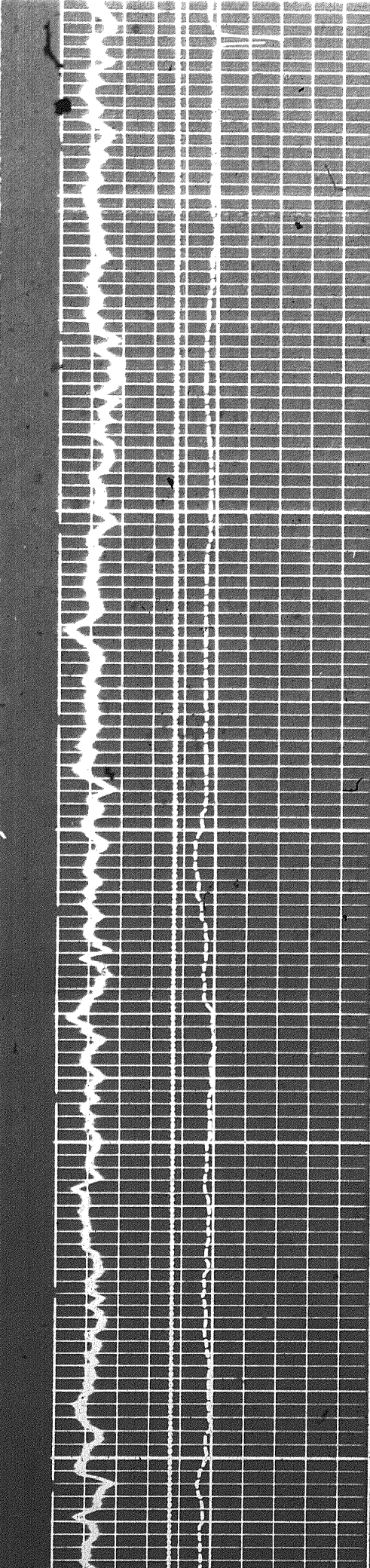
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6200

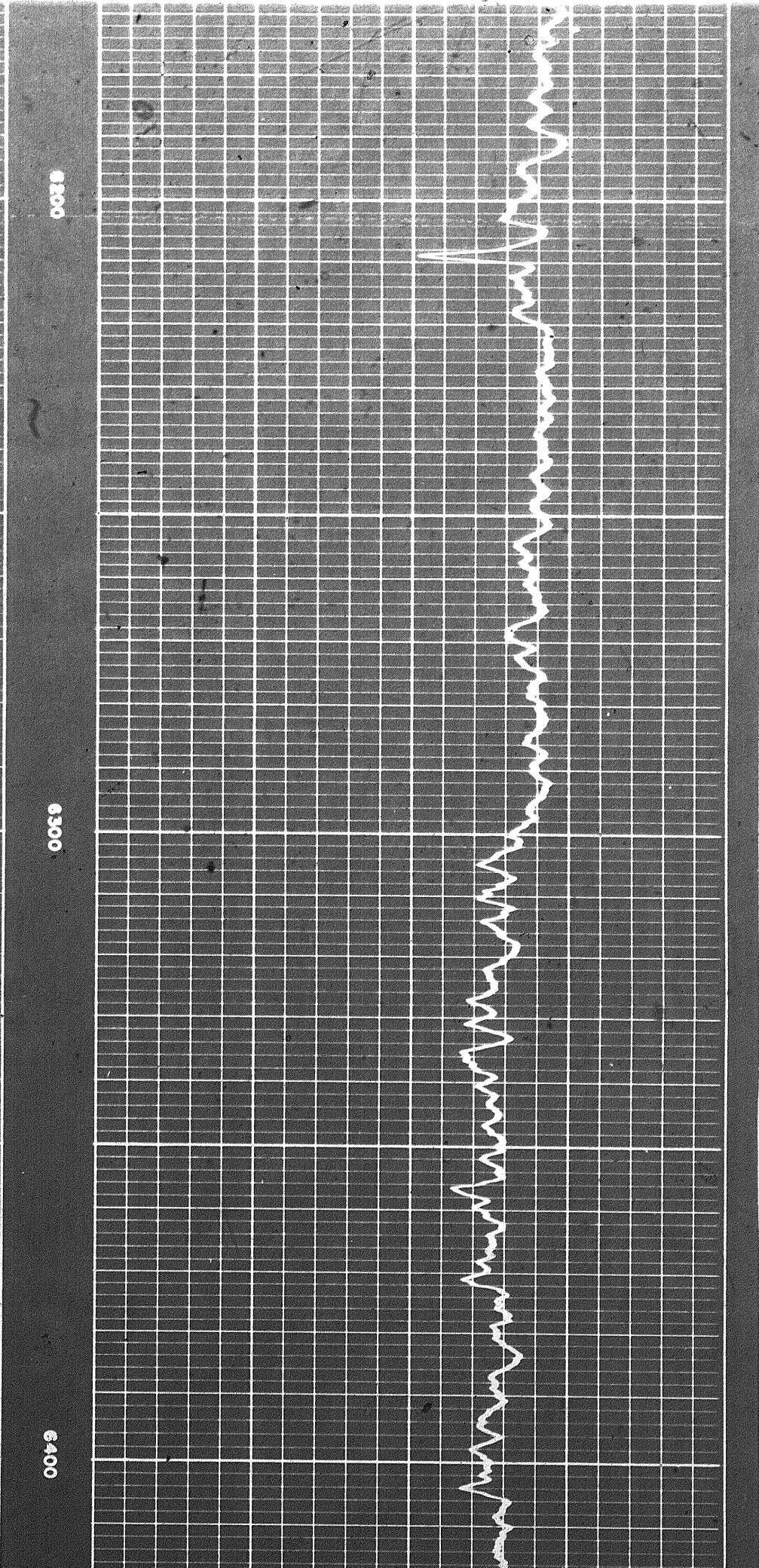
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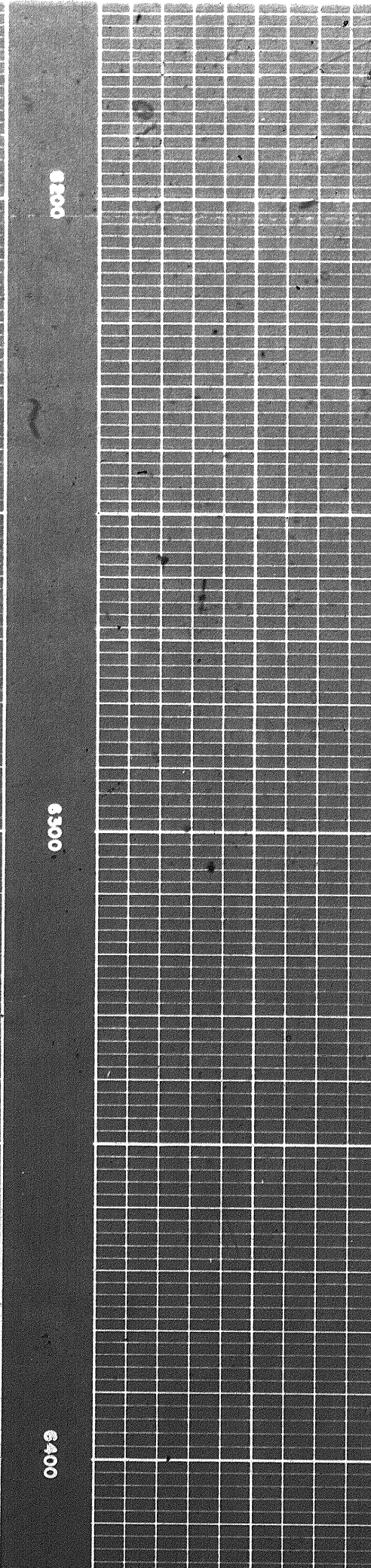
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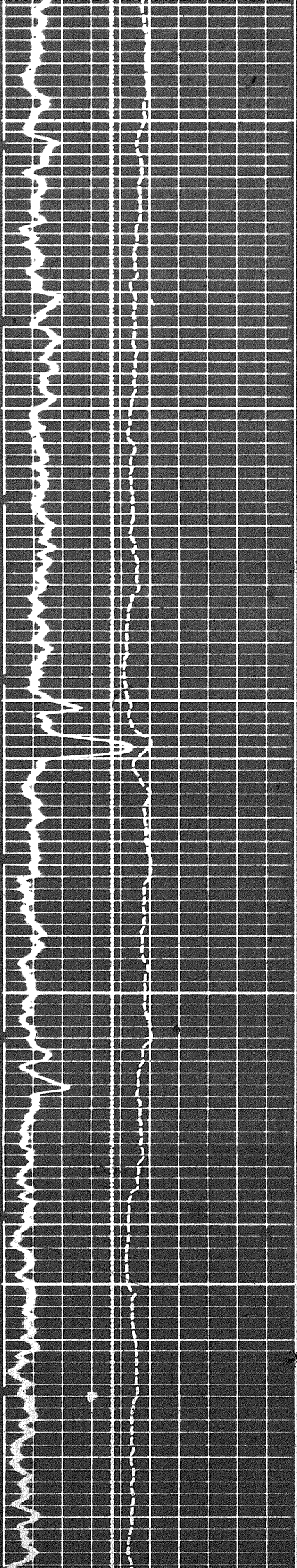
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6300



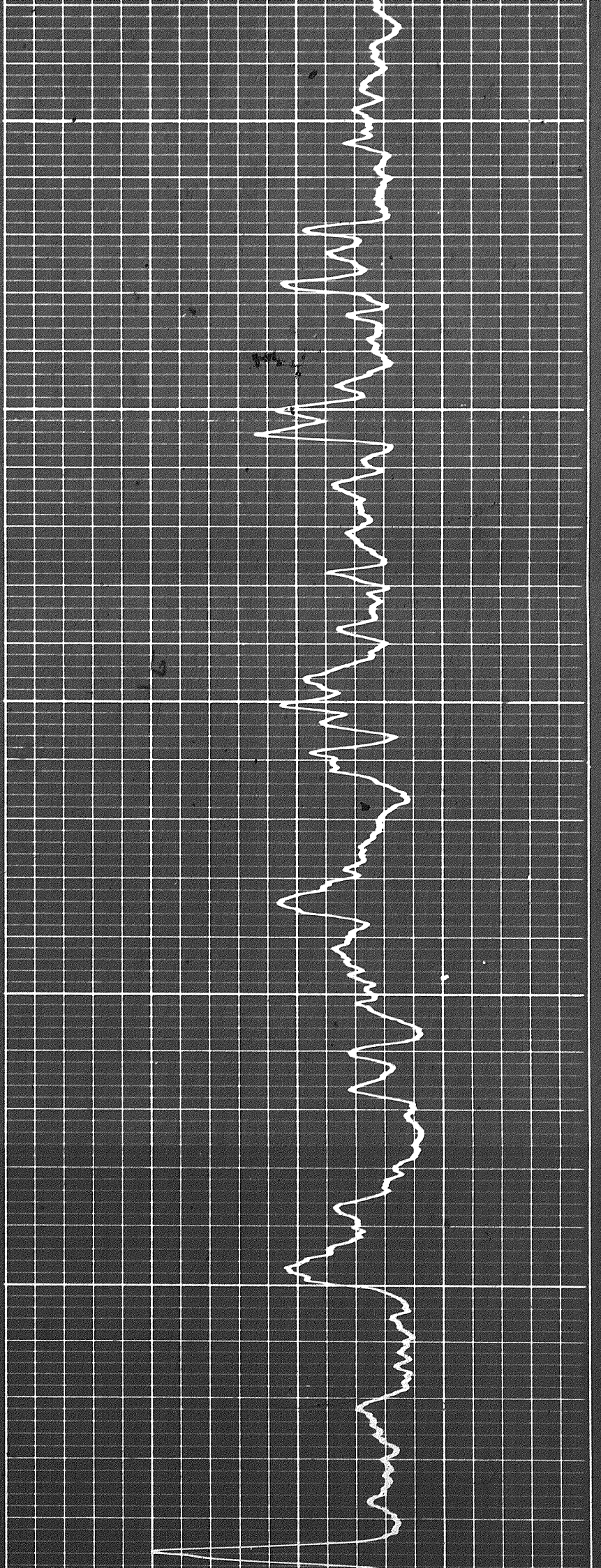
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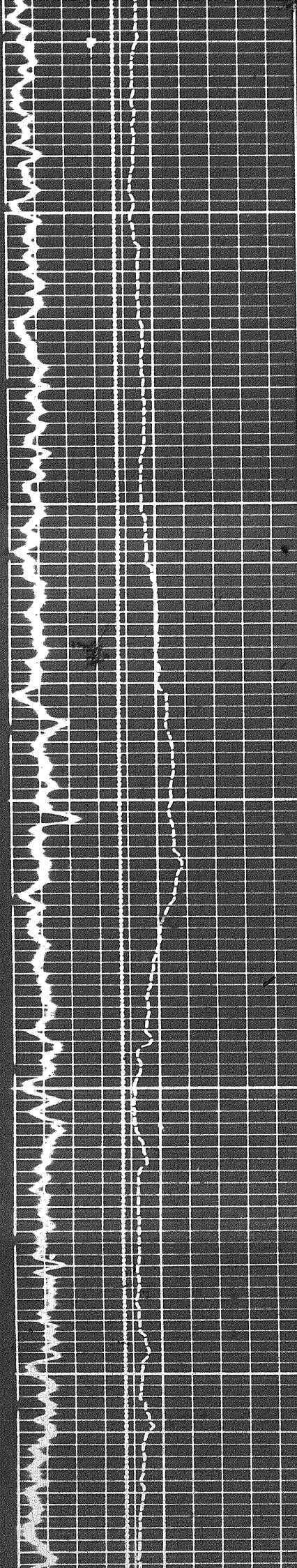


0049

0050

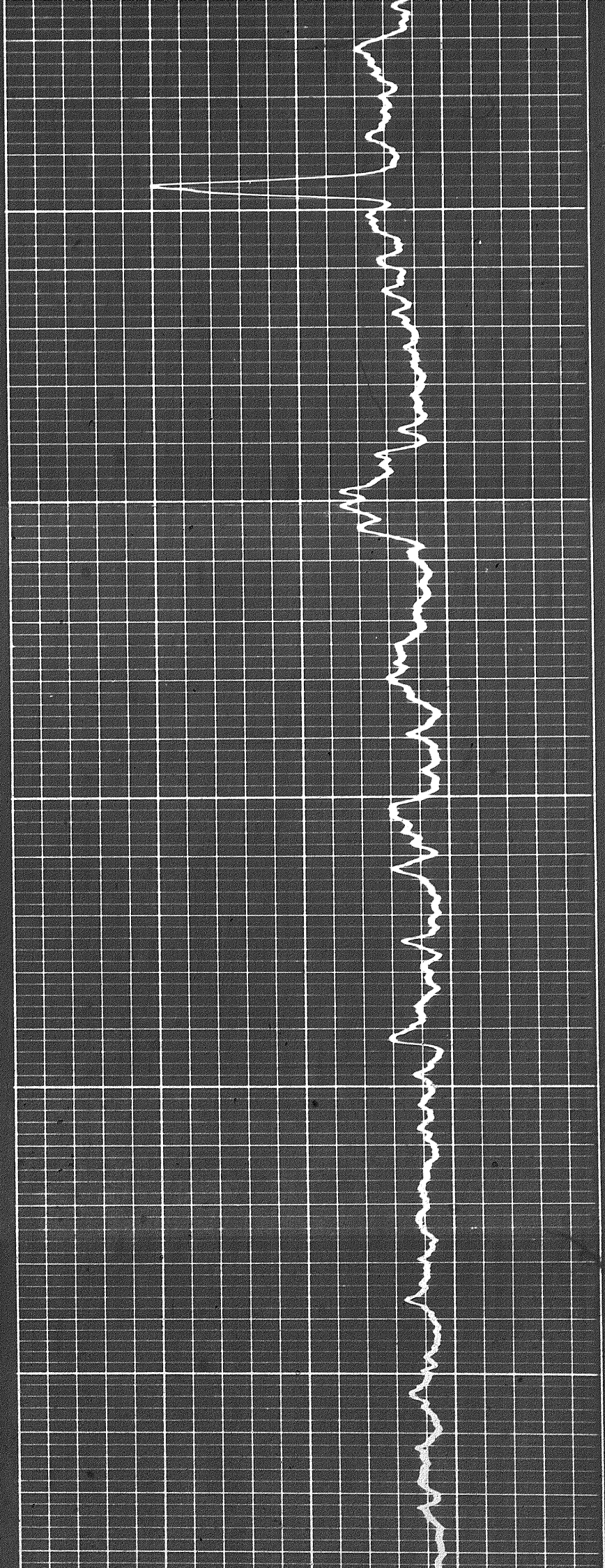
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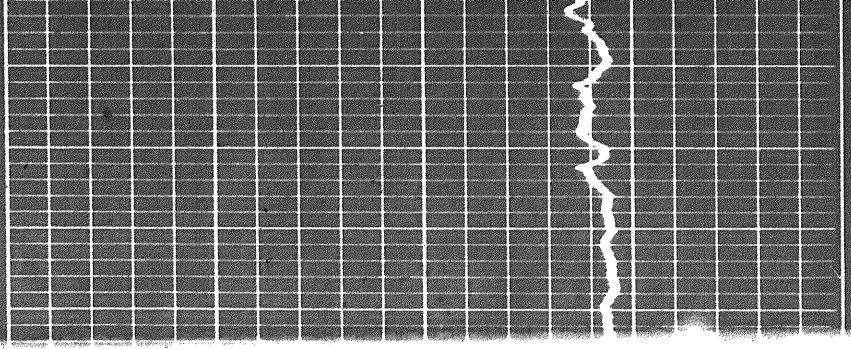
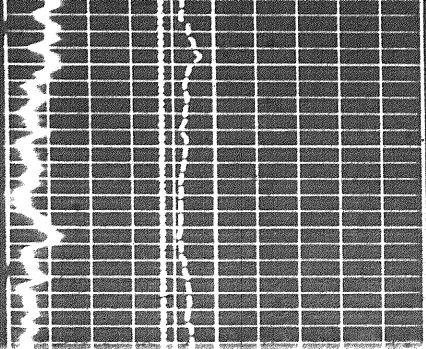
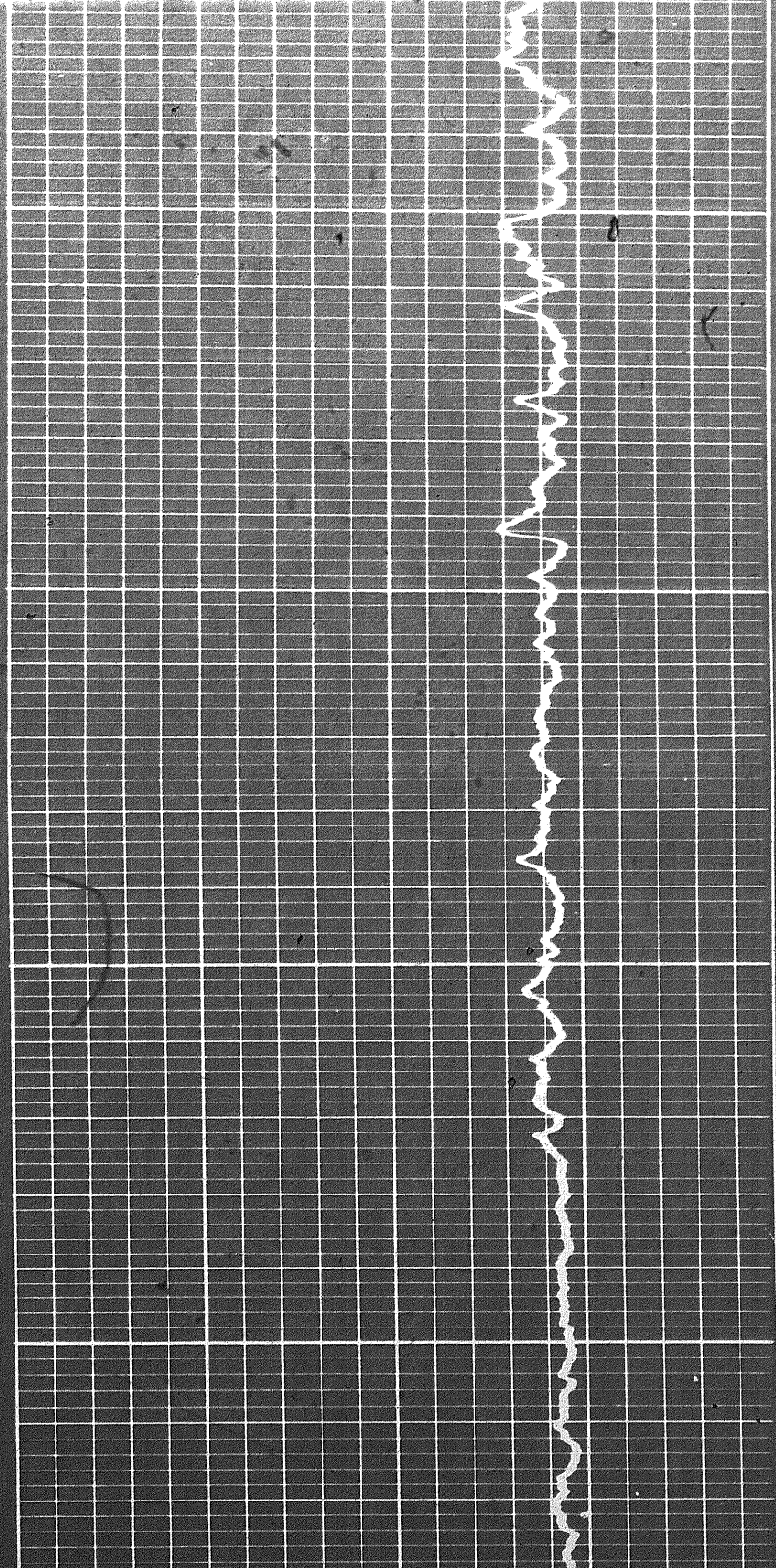
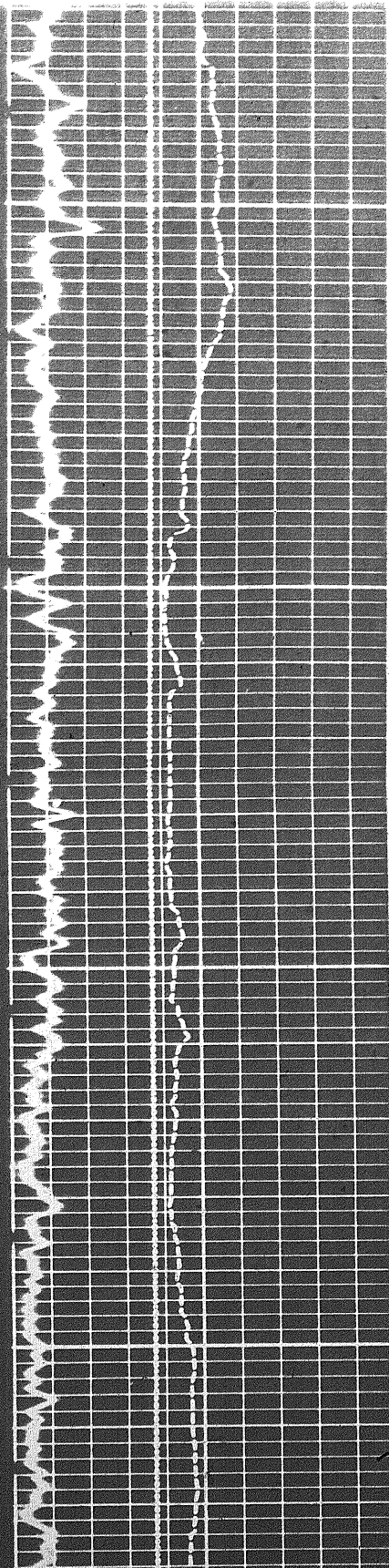
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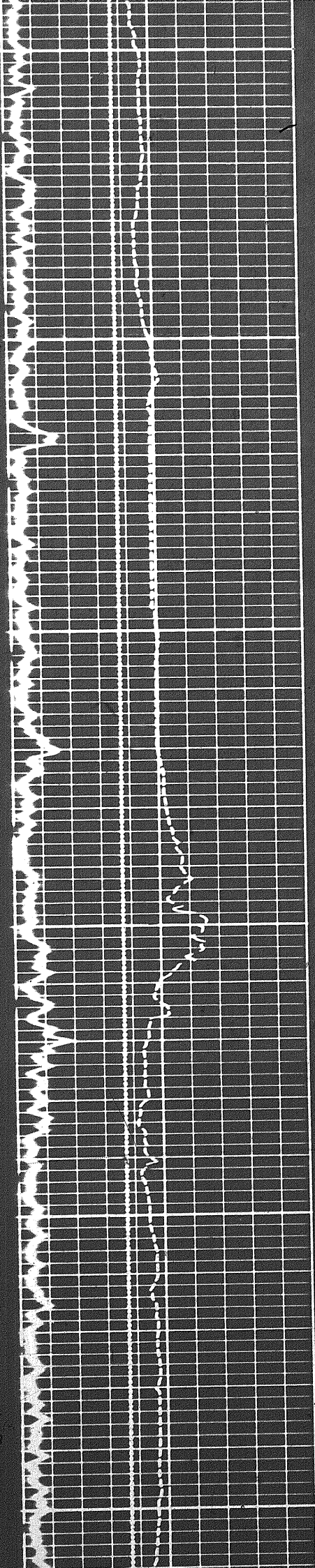


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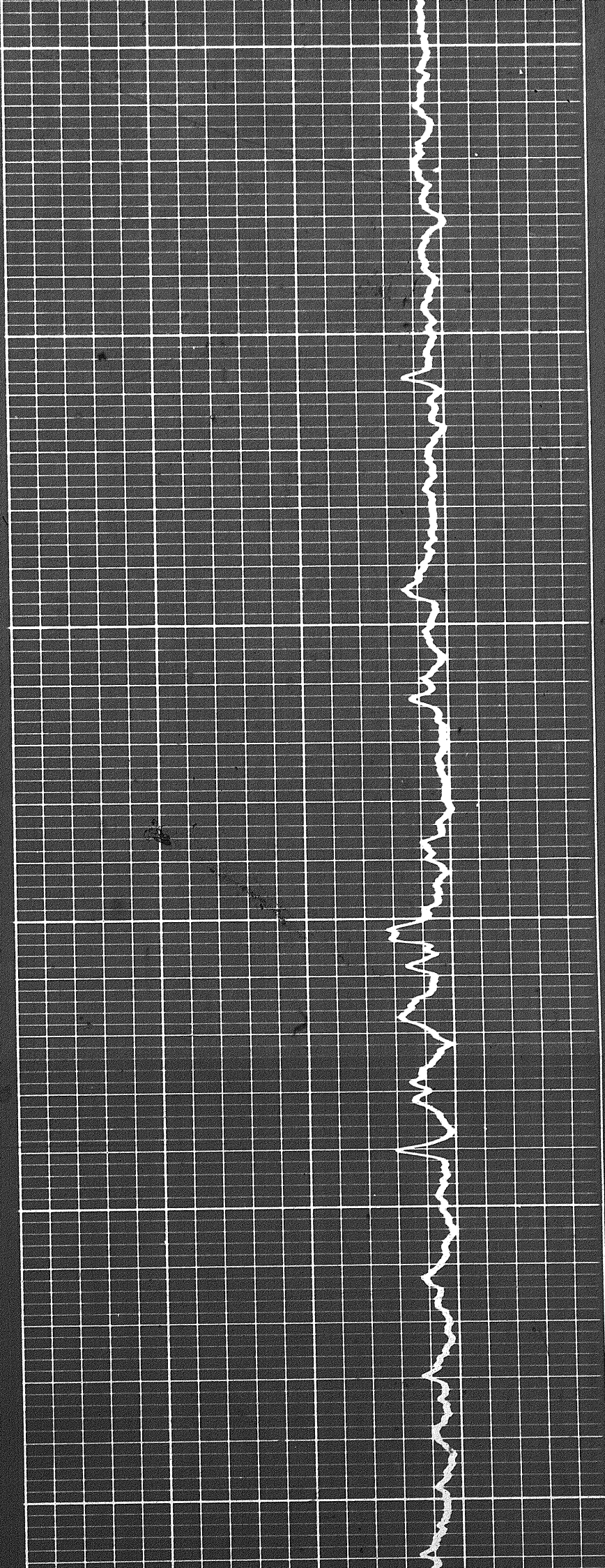
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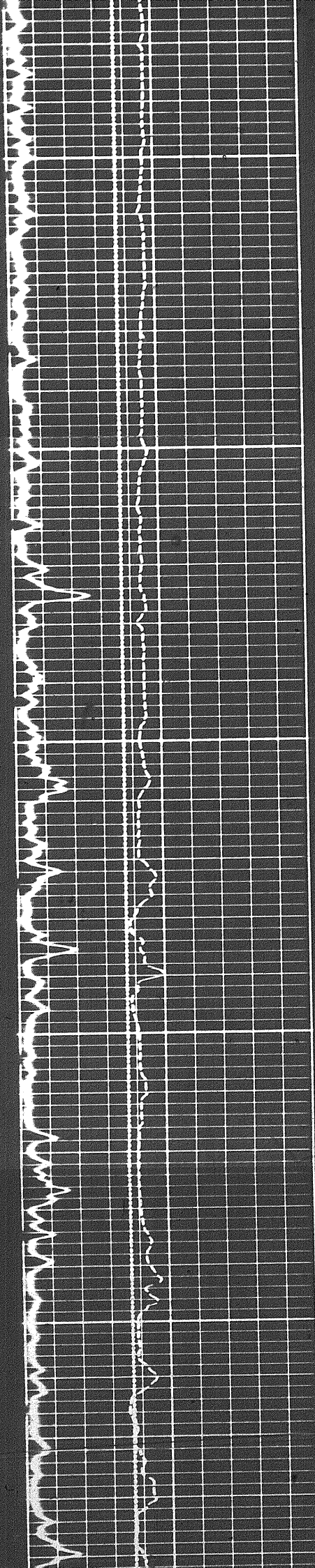


6900

7000

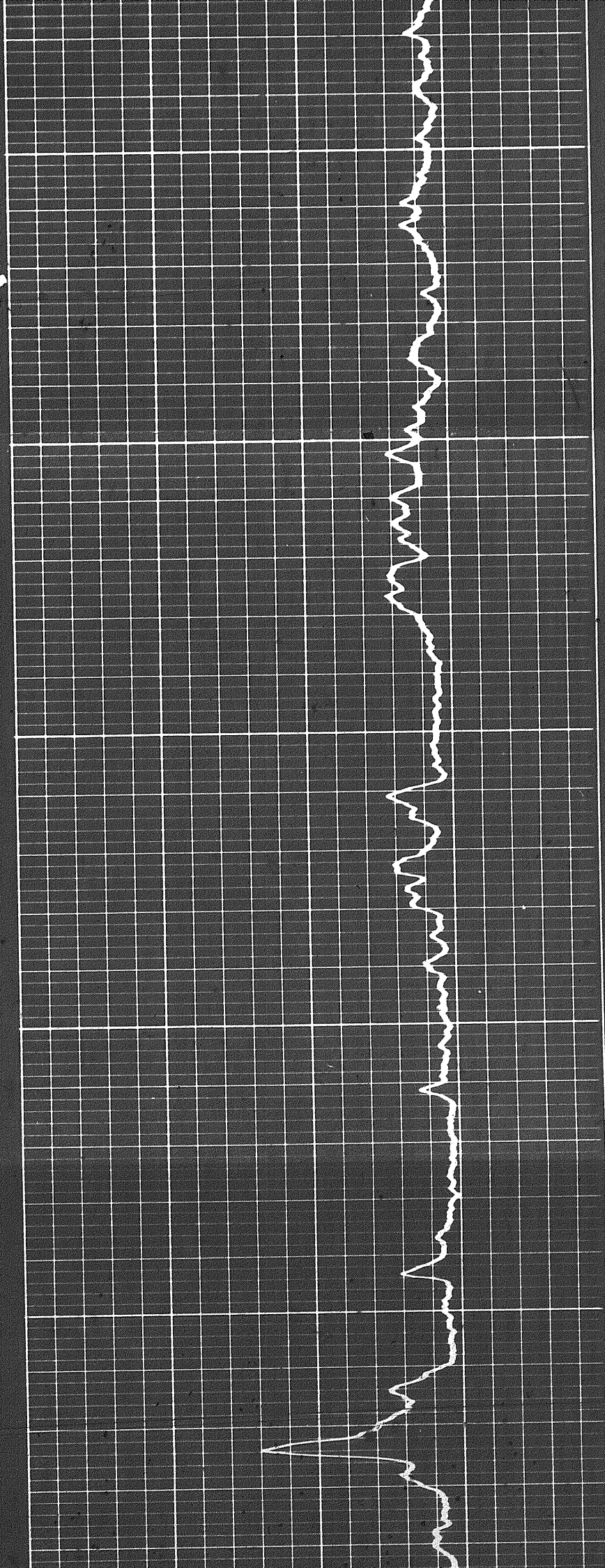
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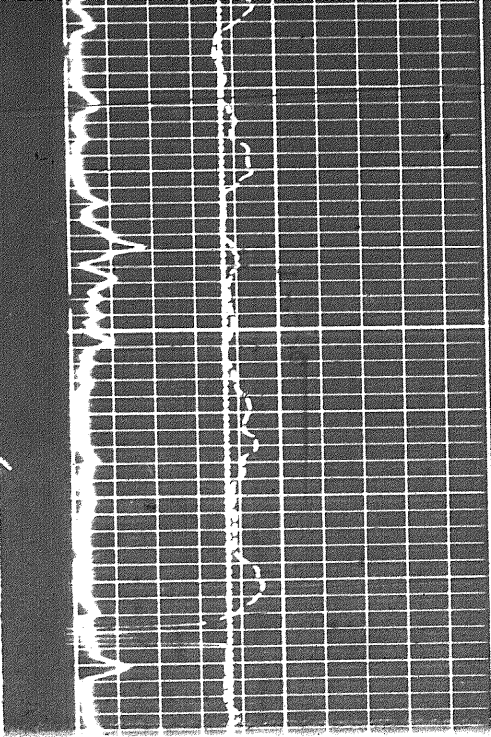




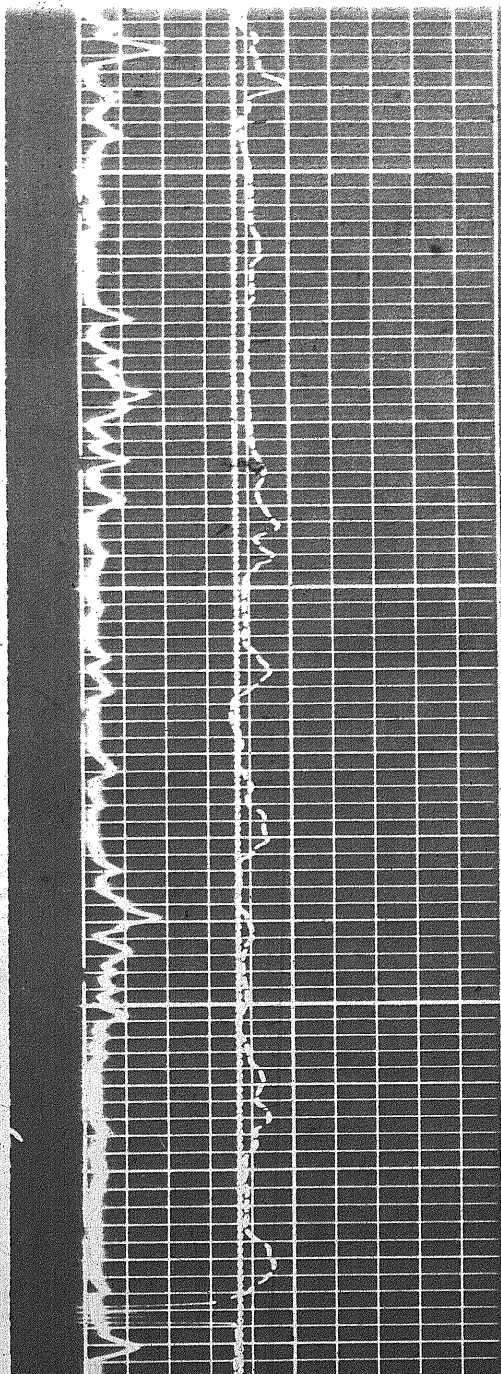
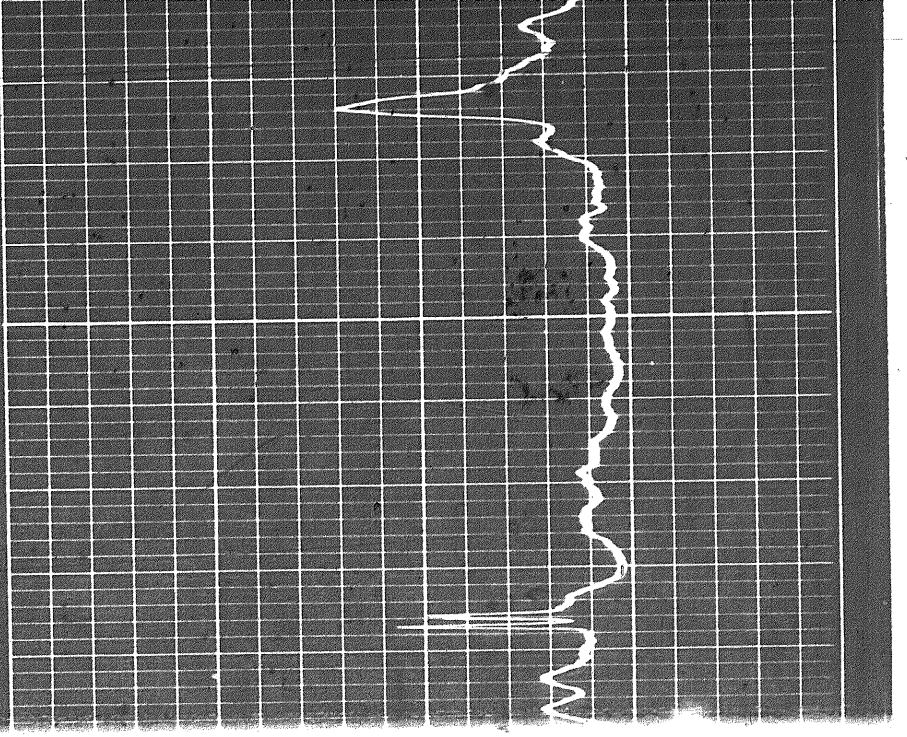
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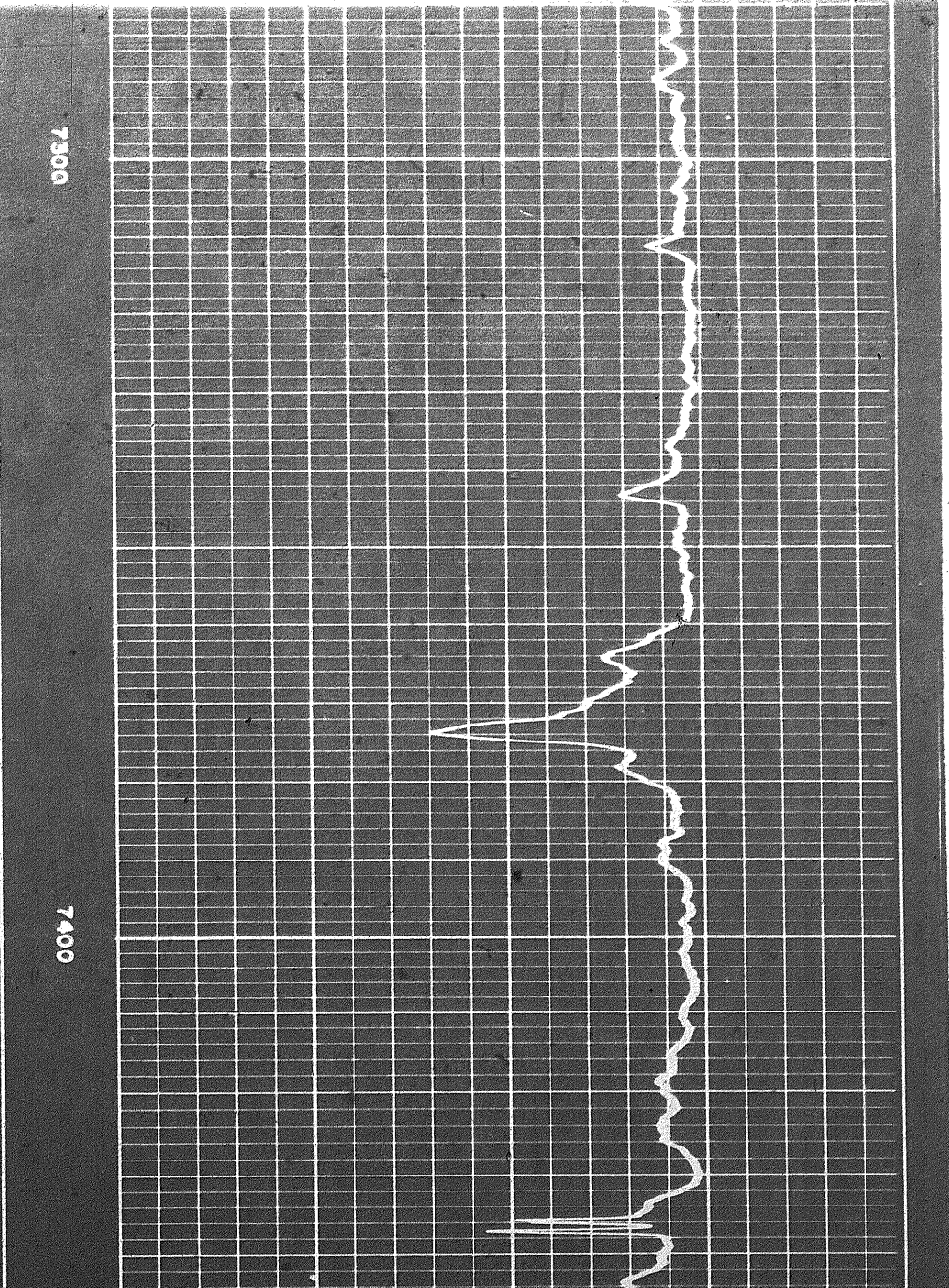




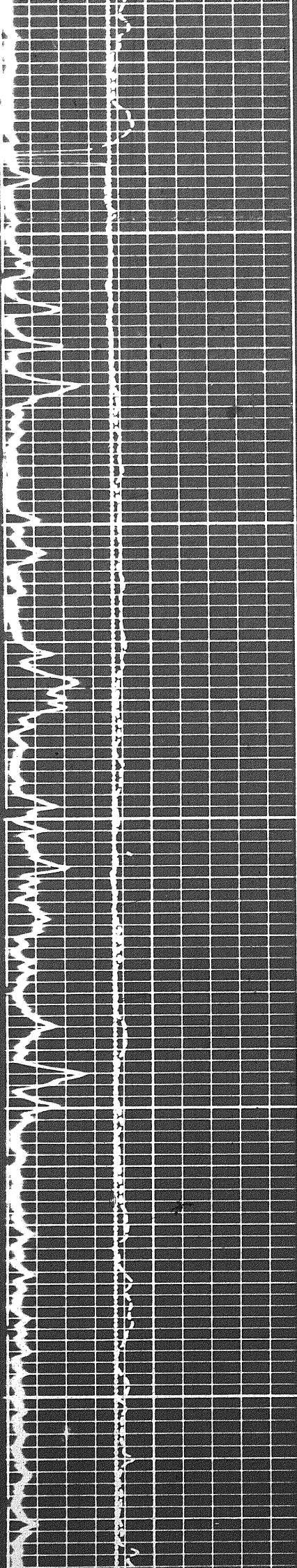
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7300

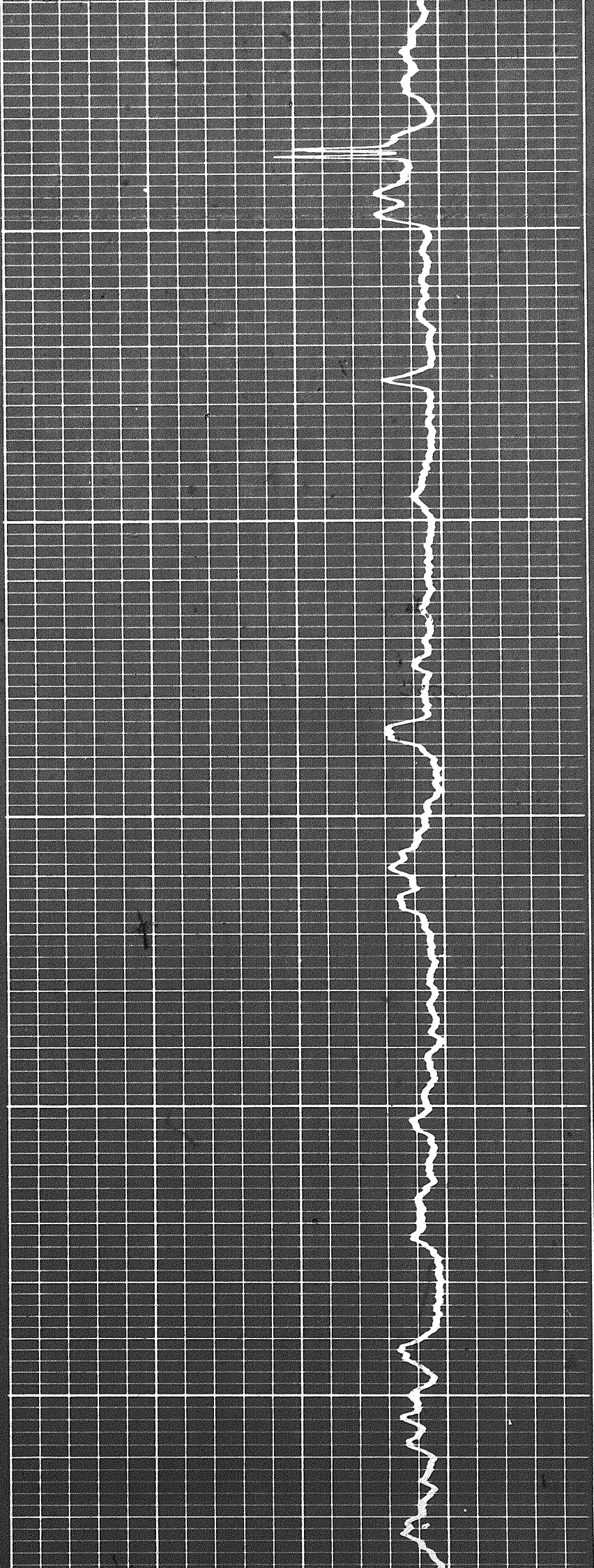


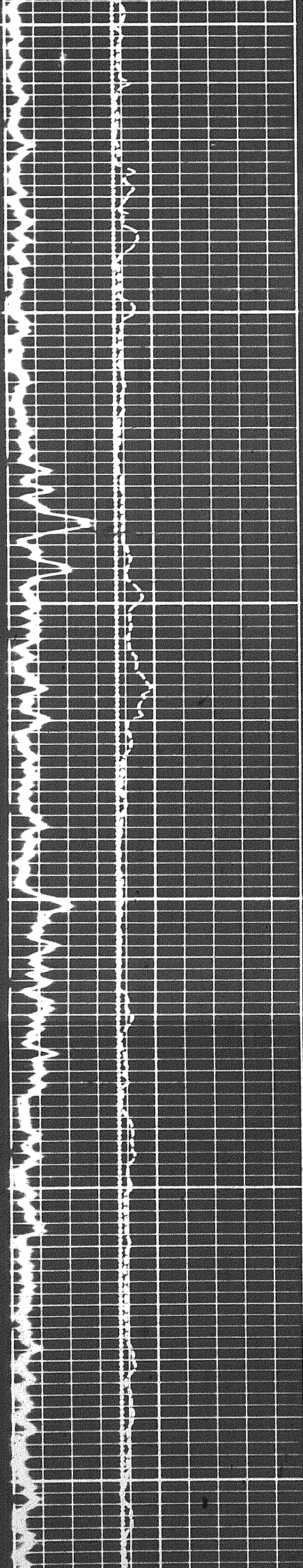
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7500

7600

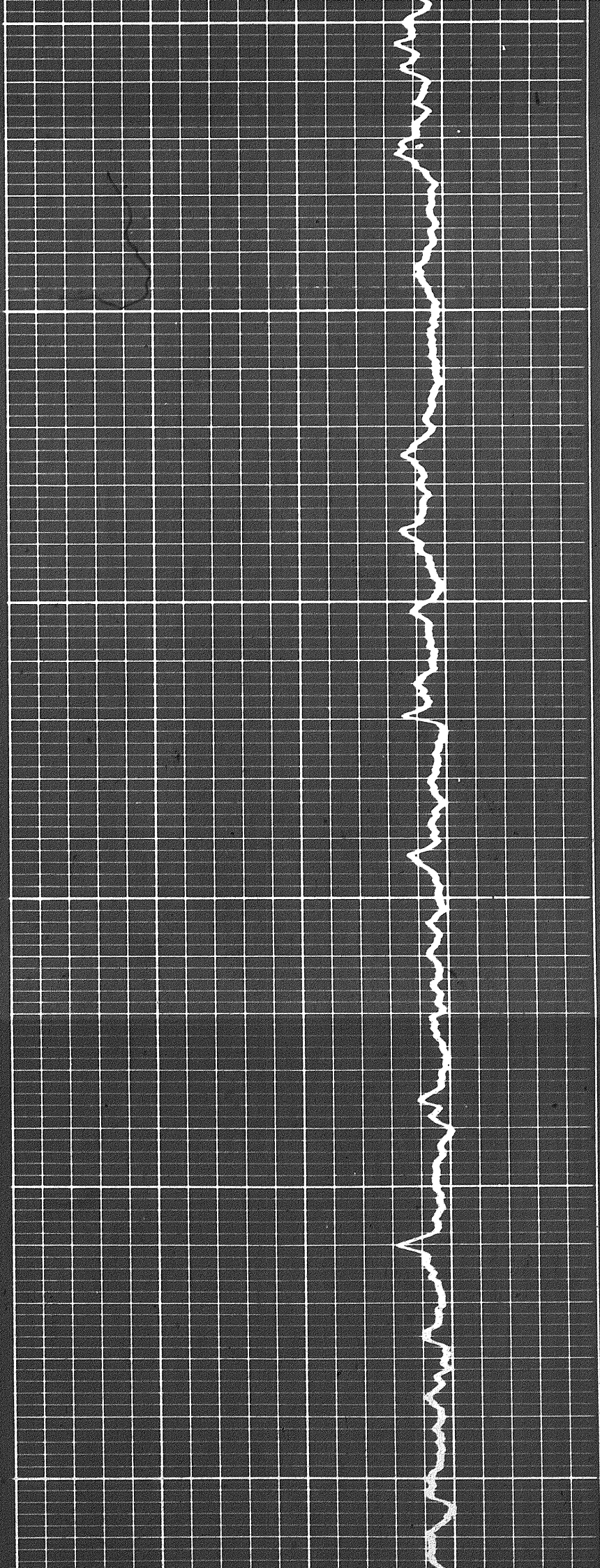


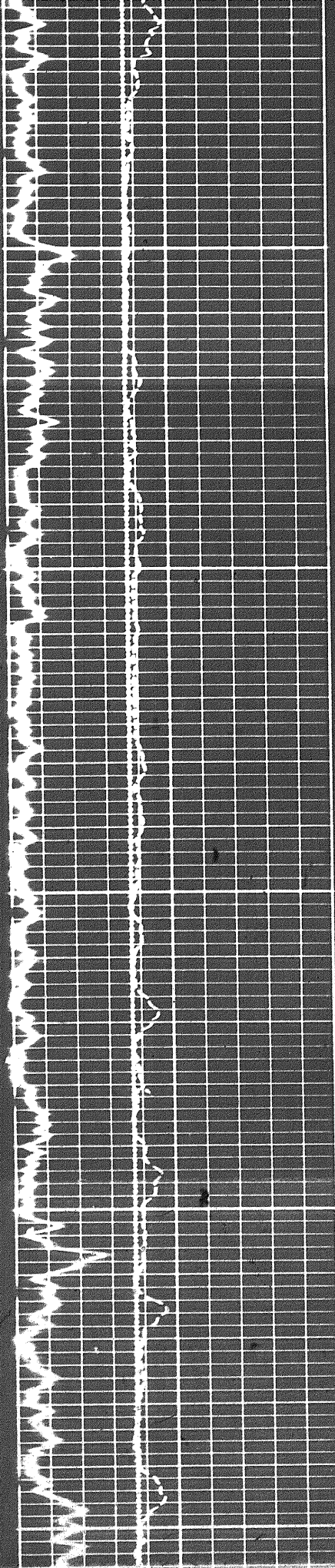


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7800

7900

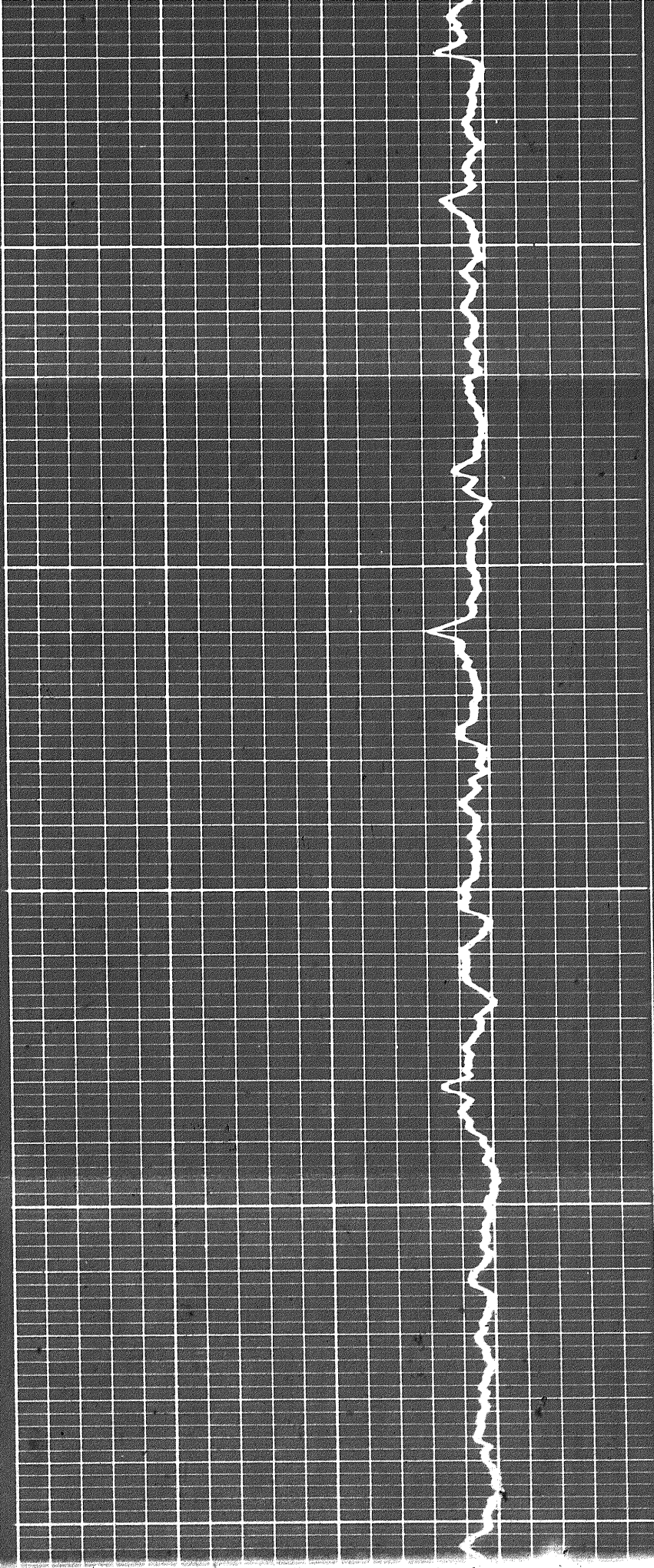


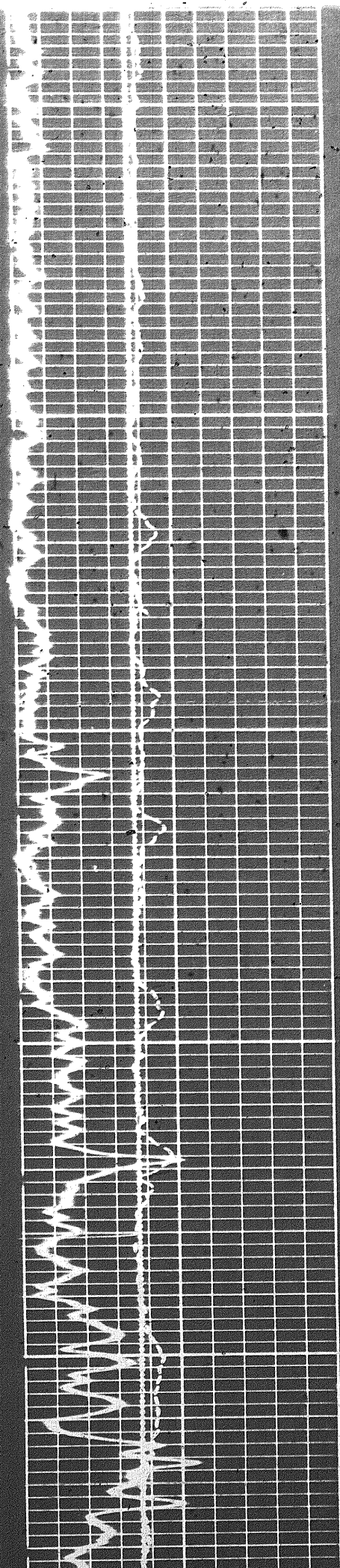


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7900

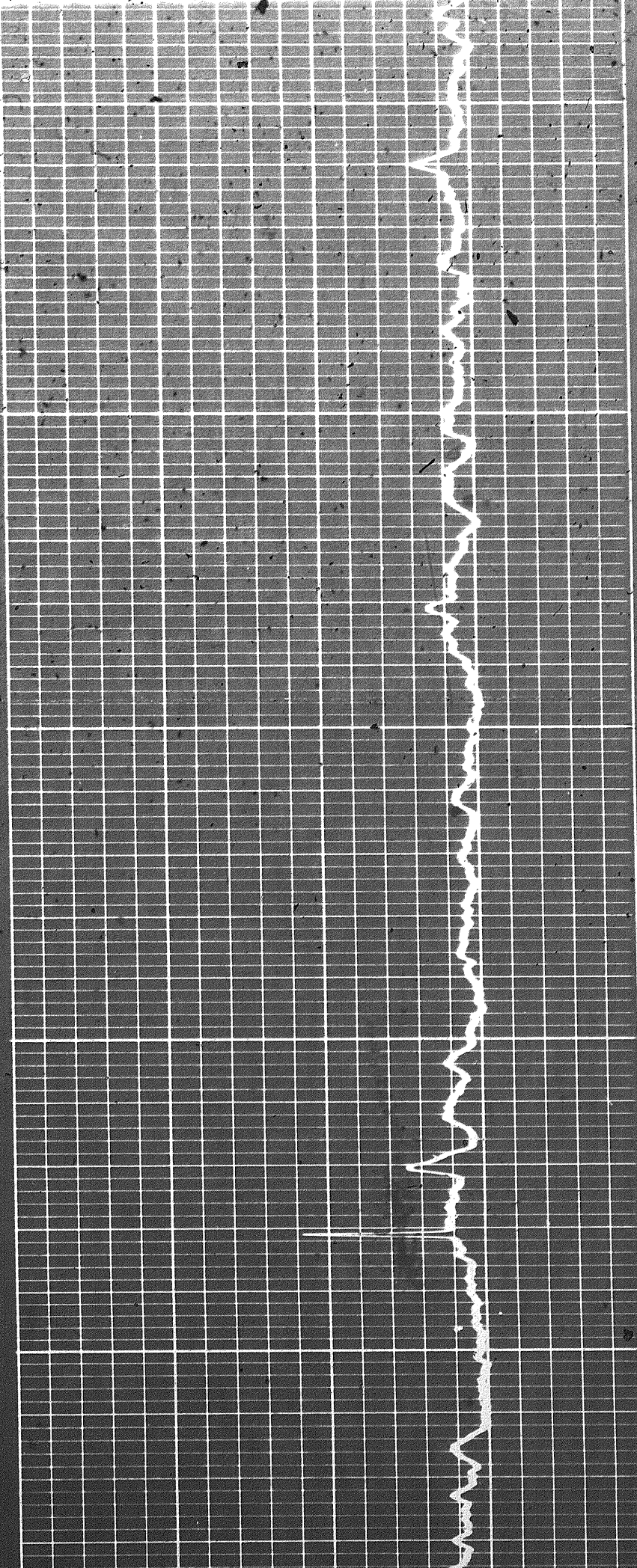
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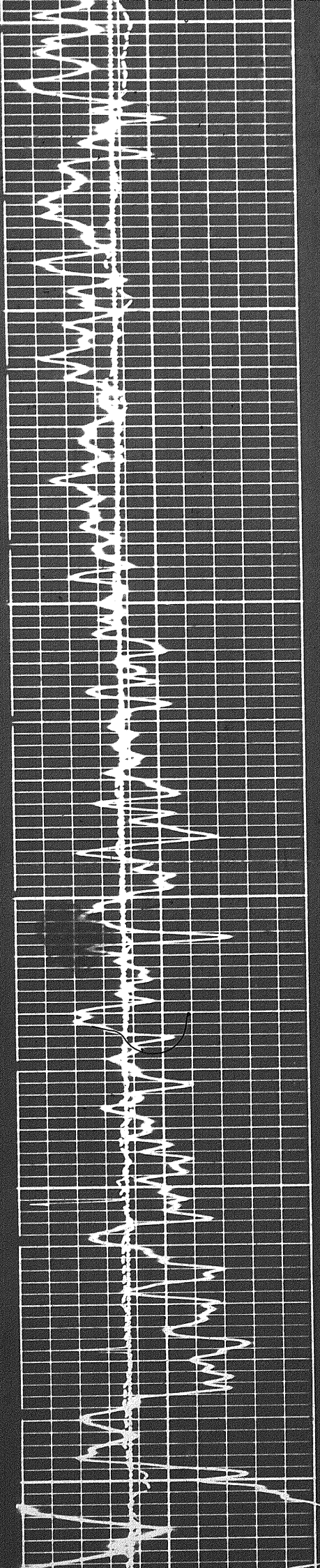


7000

8000



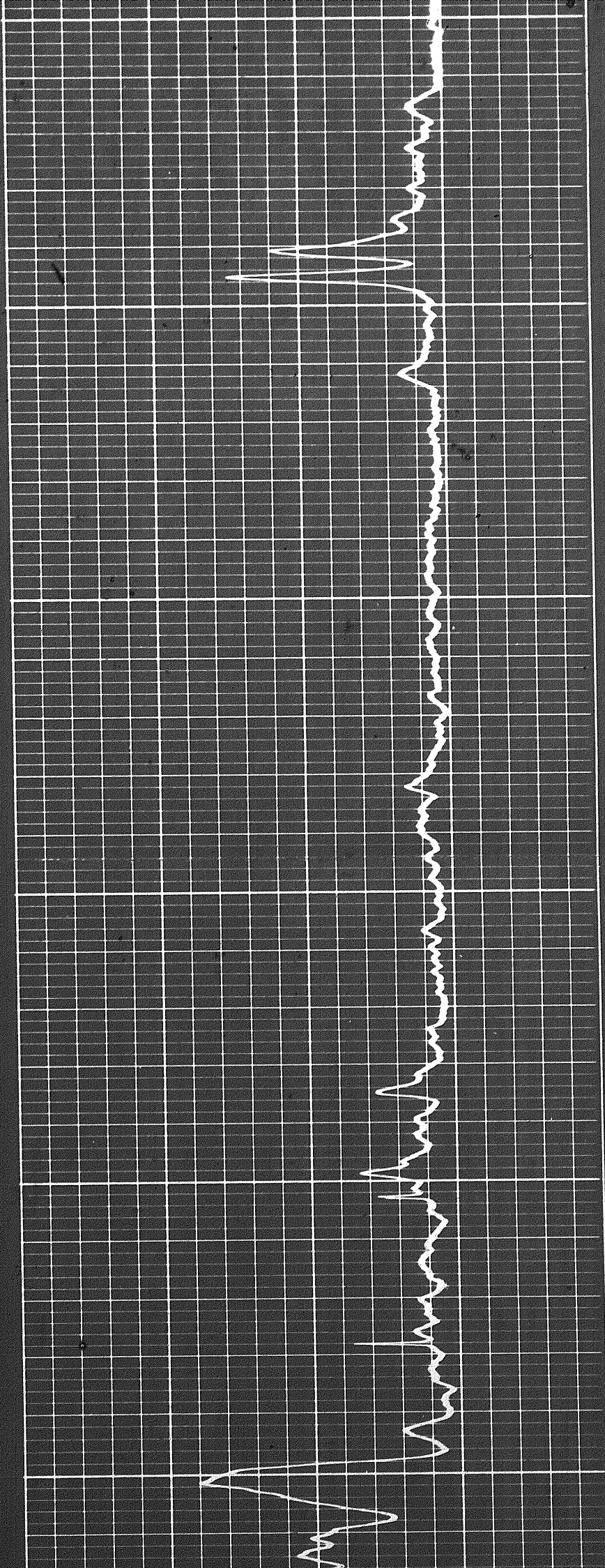
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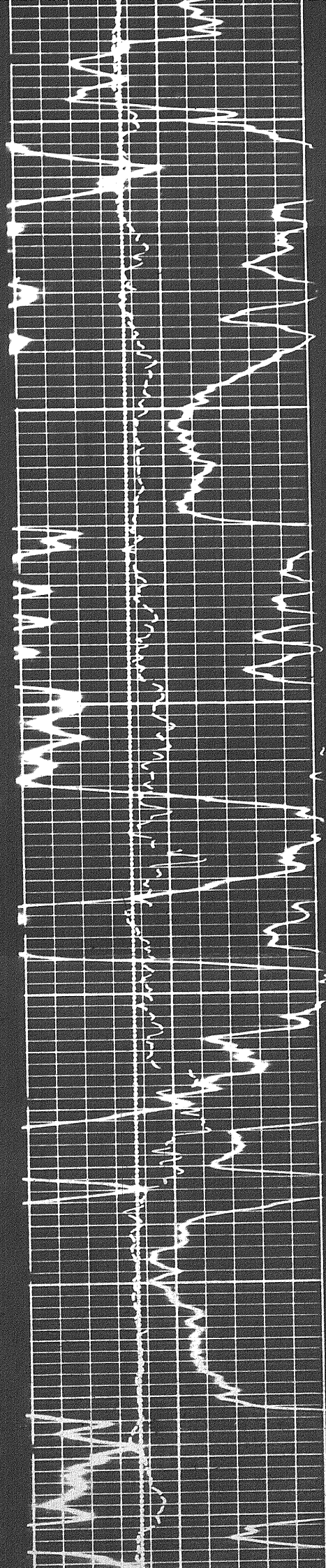


8100

8200

8300

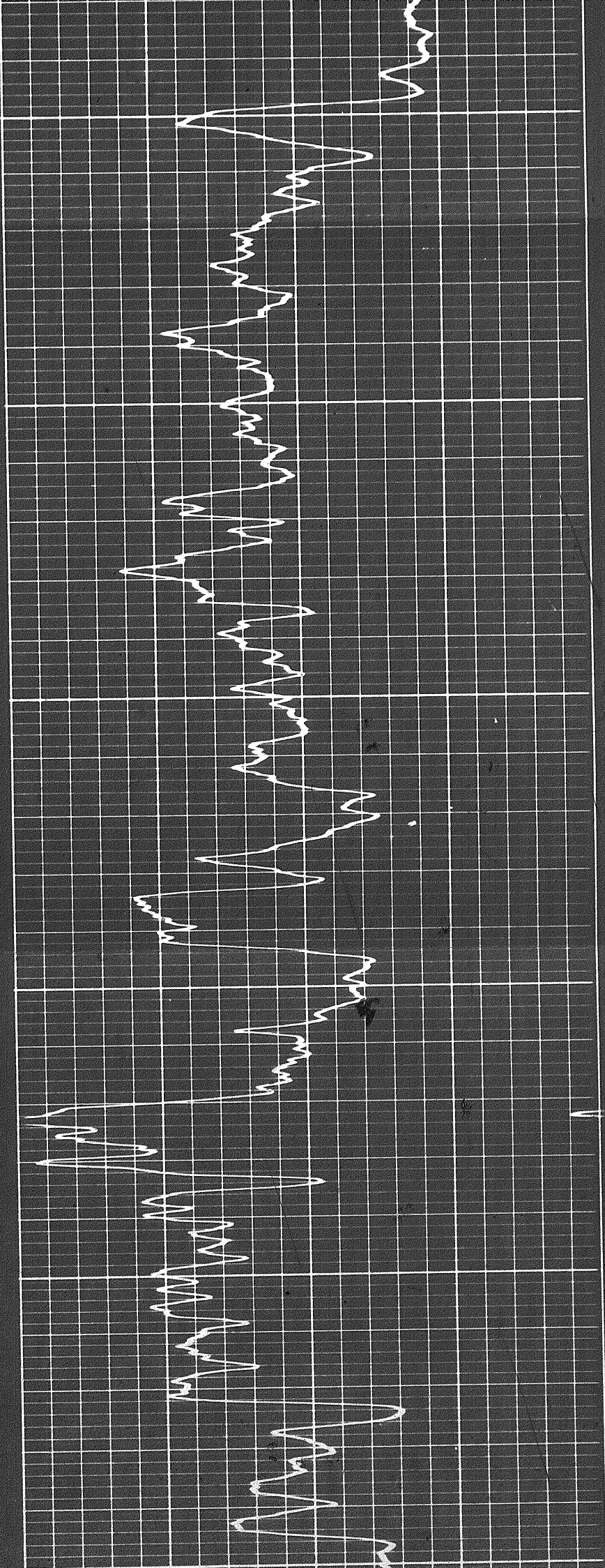


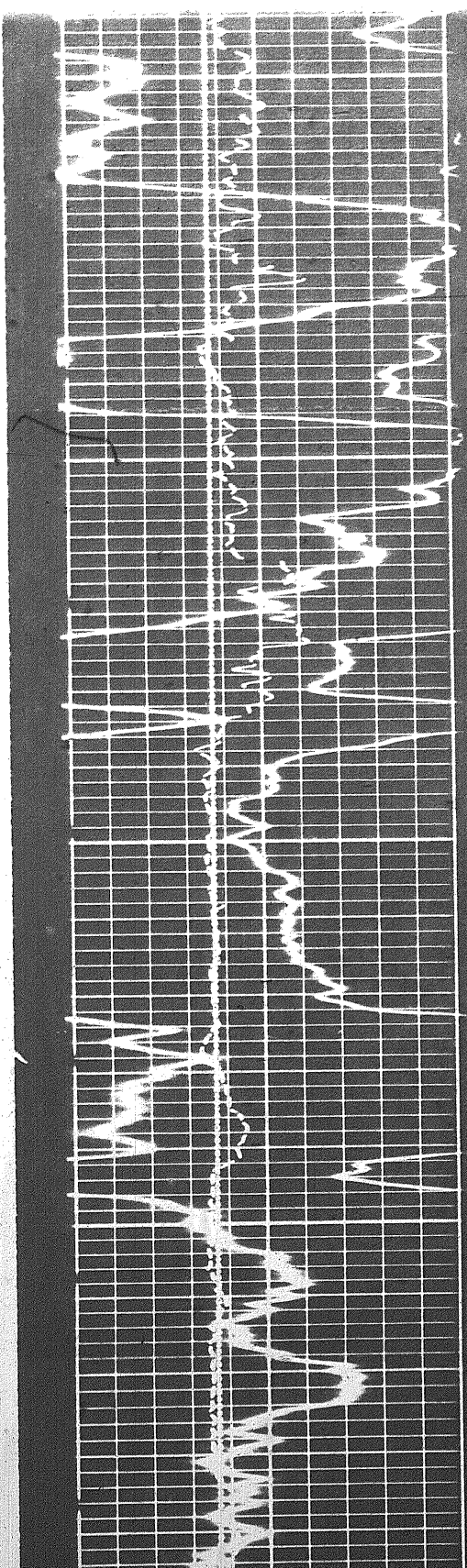
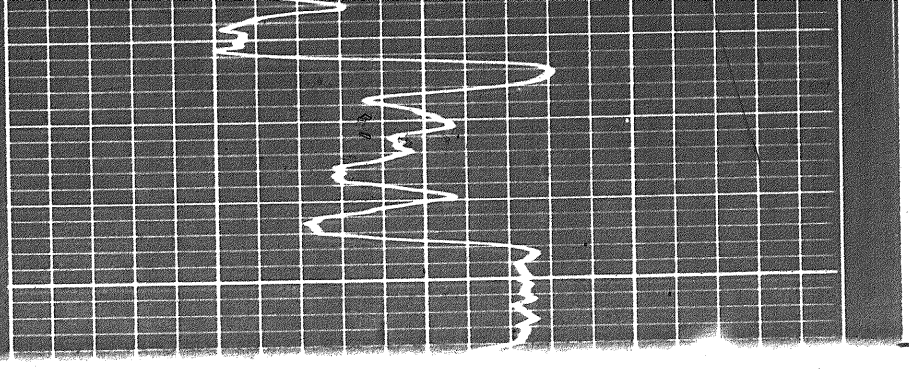
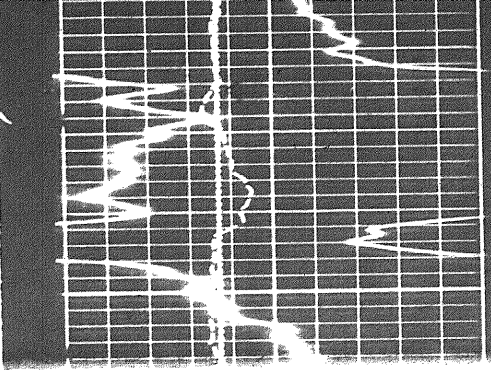


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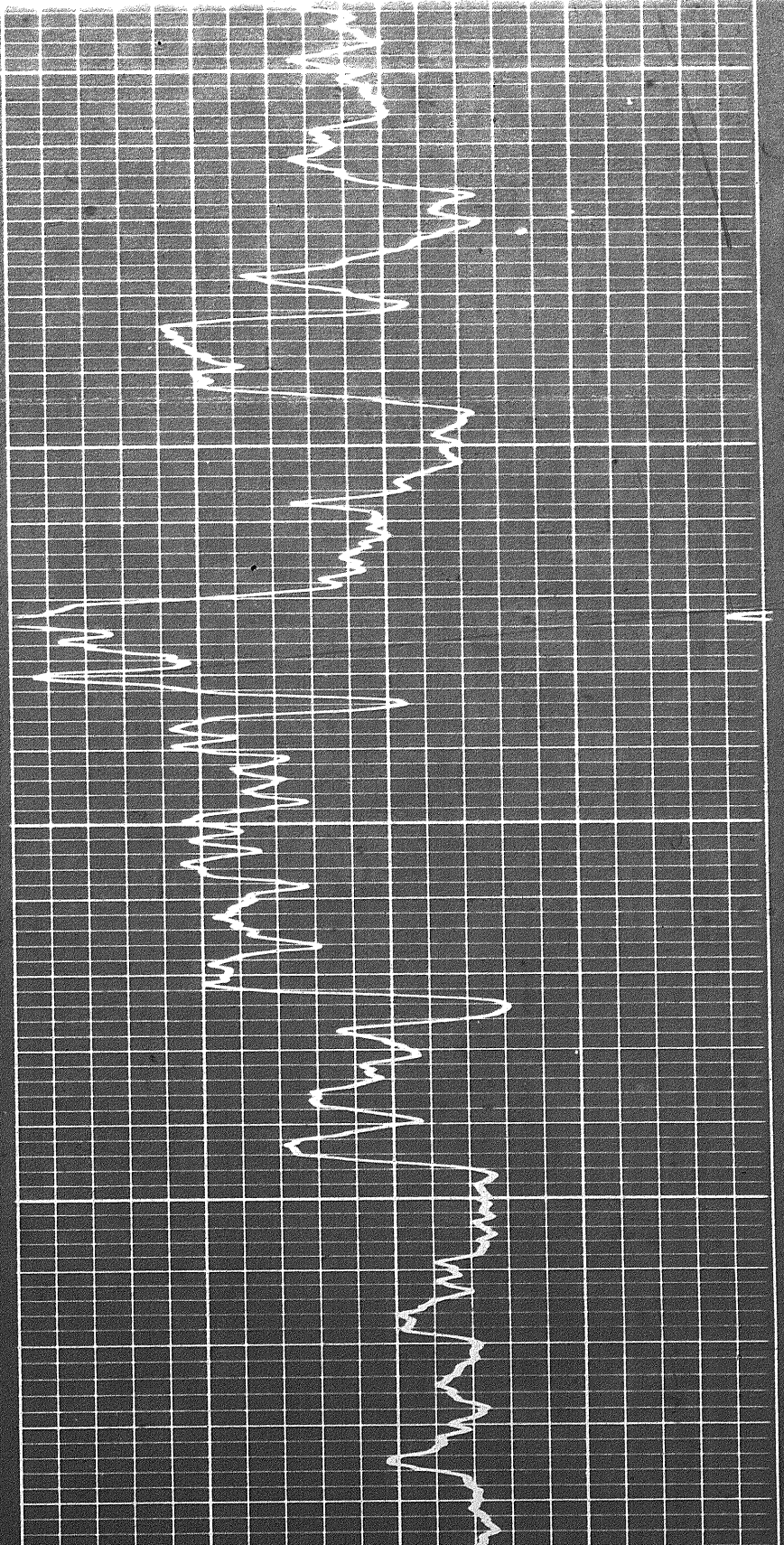
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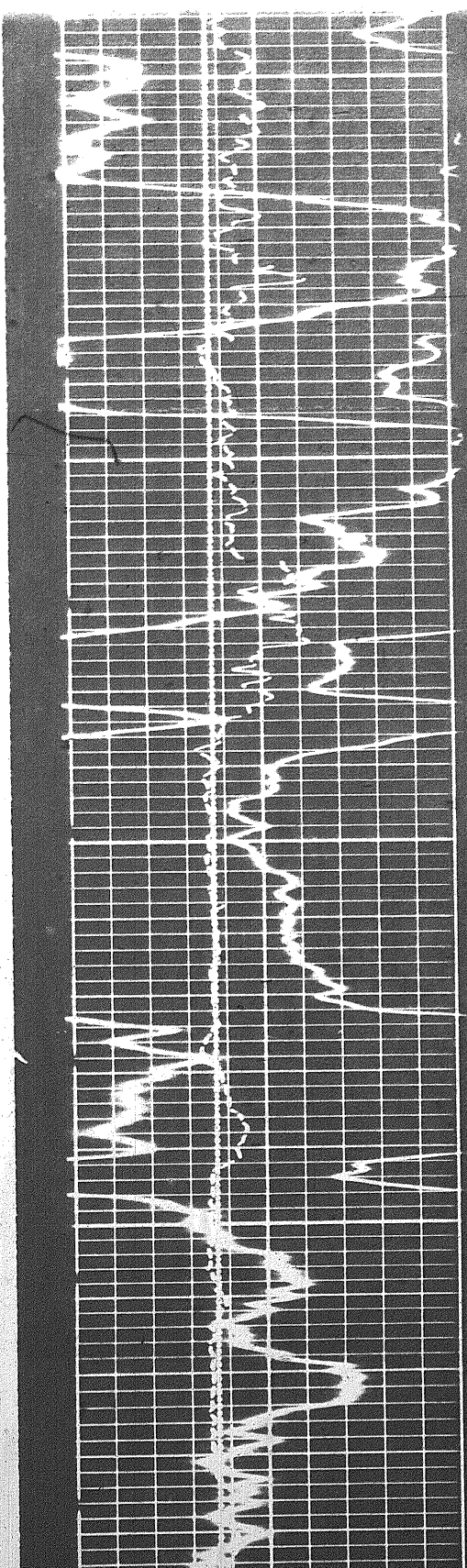
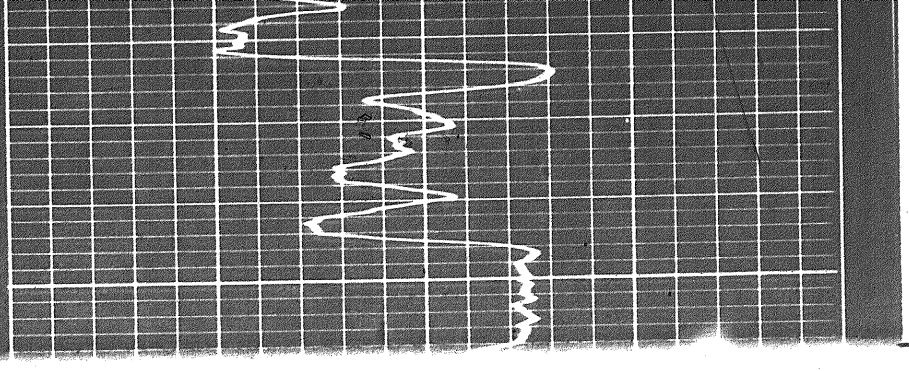
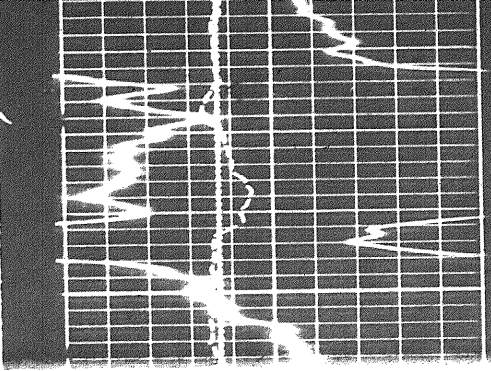




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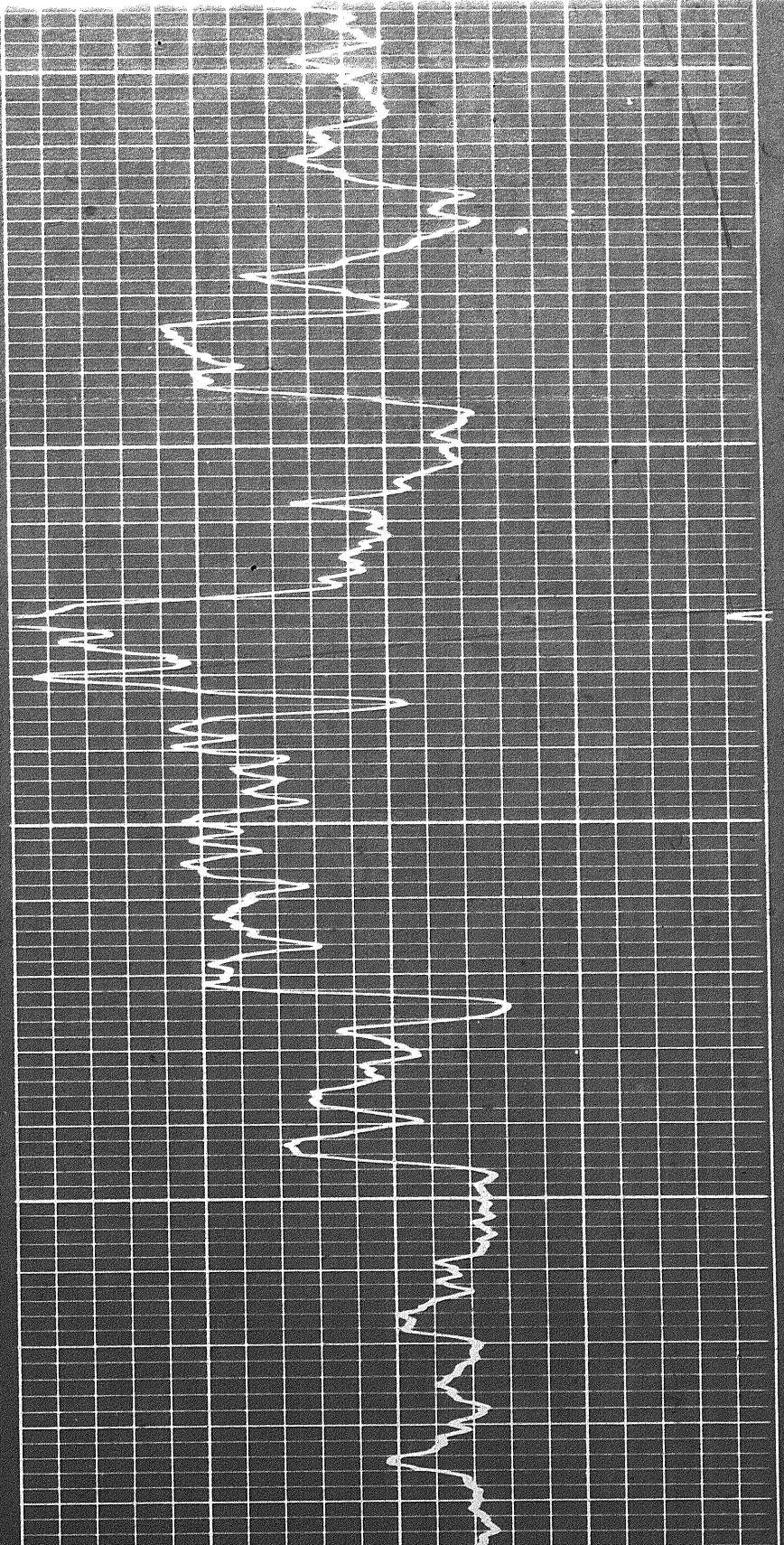
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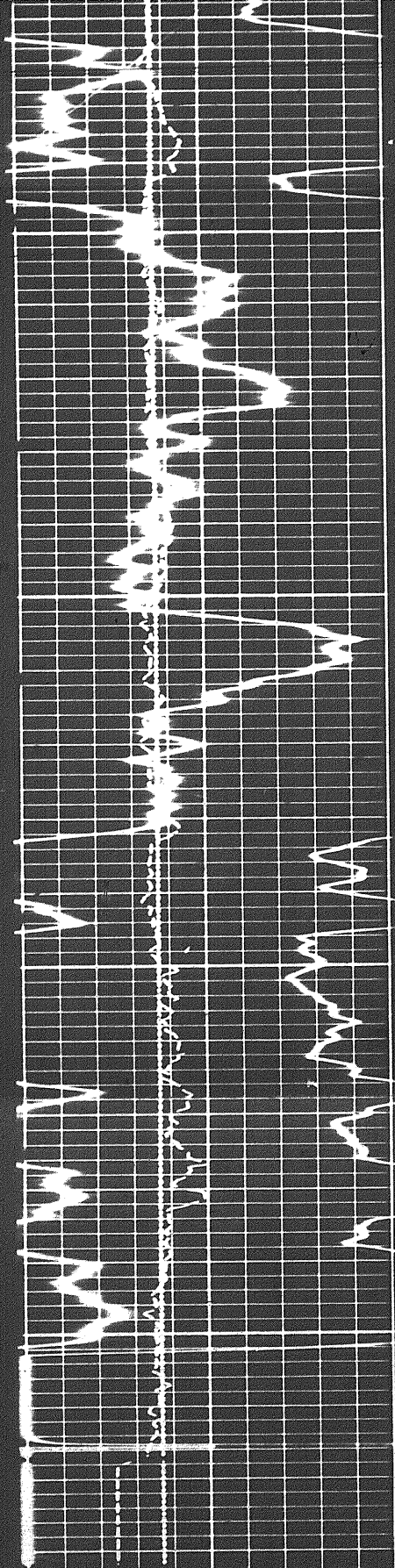




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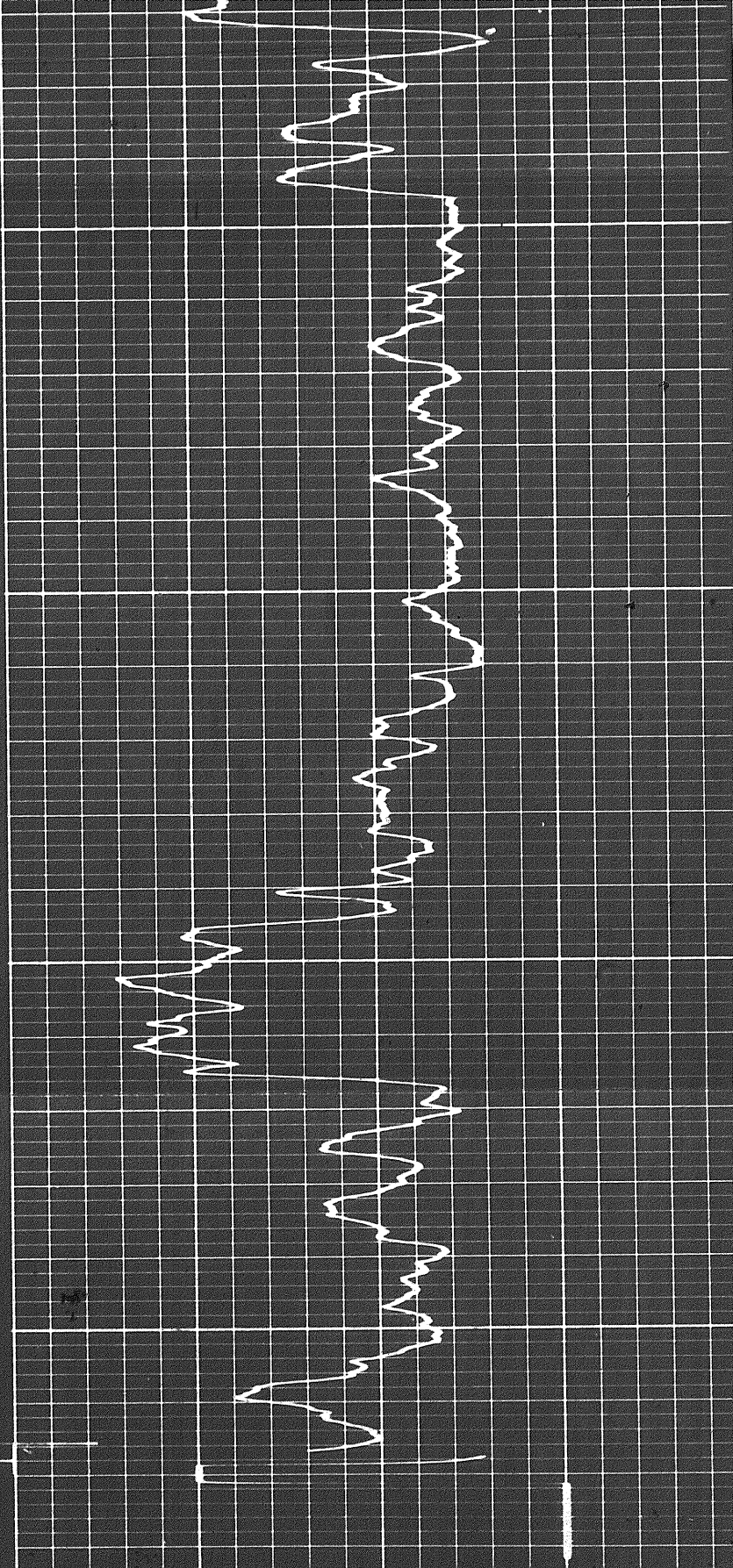




8600

8700

FR



Sens.	100	T.C.	2
Zero	0	div. to left	100
	100		200

GAMMA RAY

CALIPER
hole diameter in inches

DEPTH

POROSITY (%)

Calibration after Survey

Run 1

14

15

13

12

11

10

Calibration before Survey

14



0000

11

10

Calibration after Survey

Run 2

14

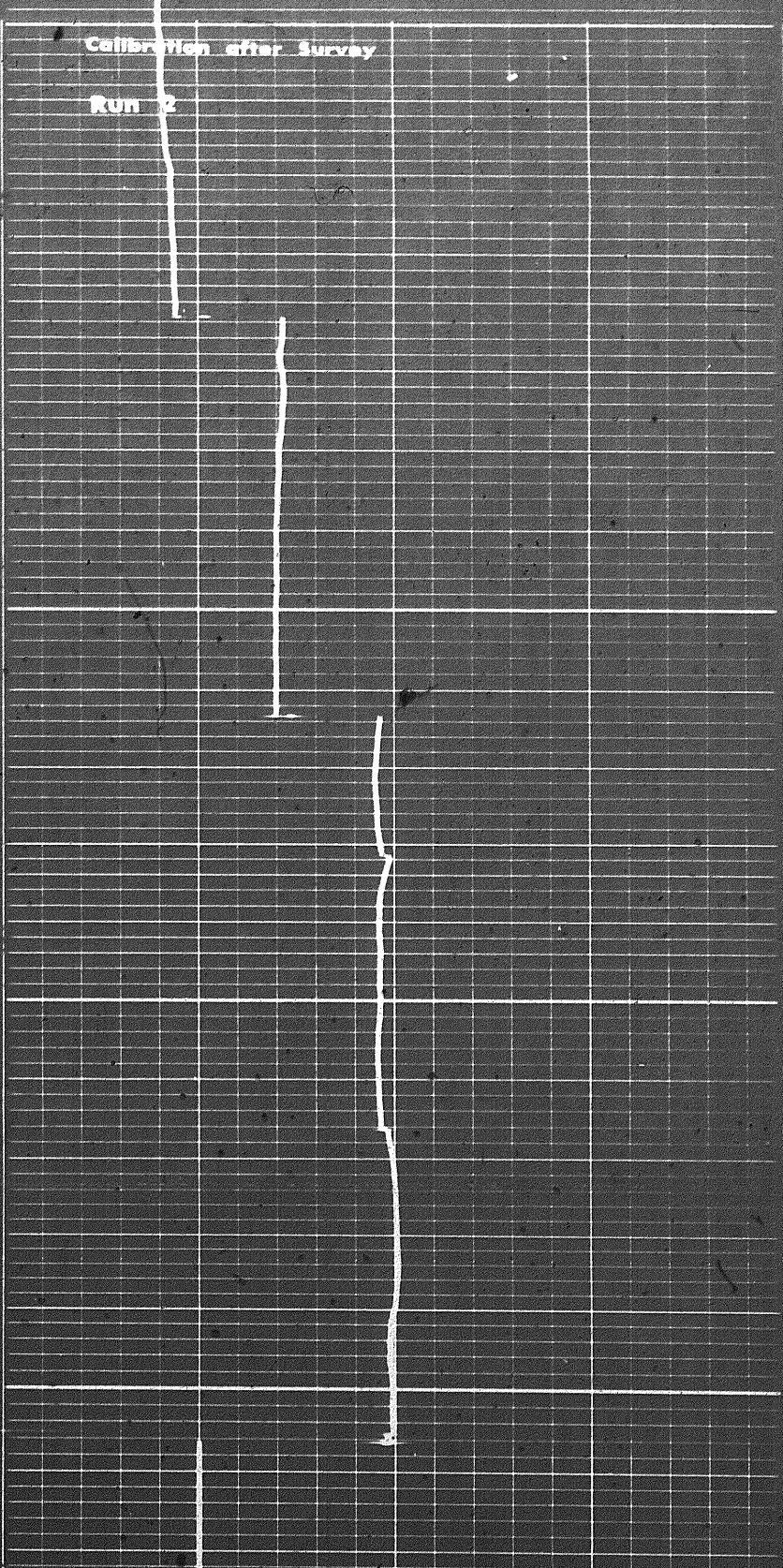
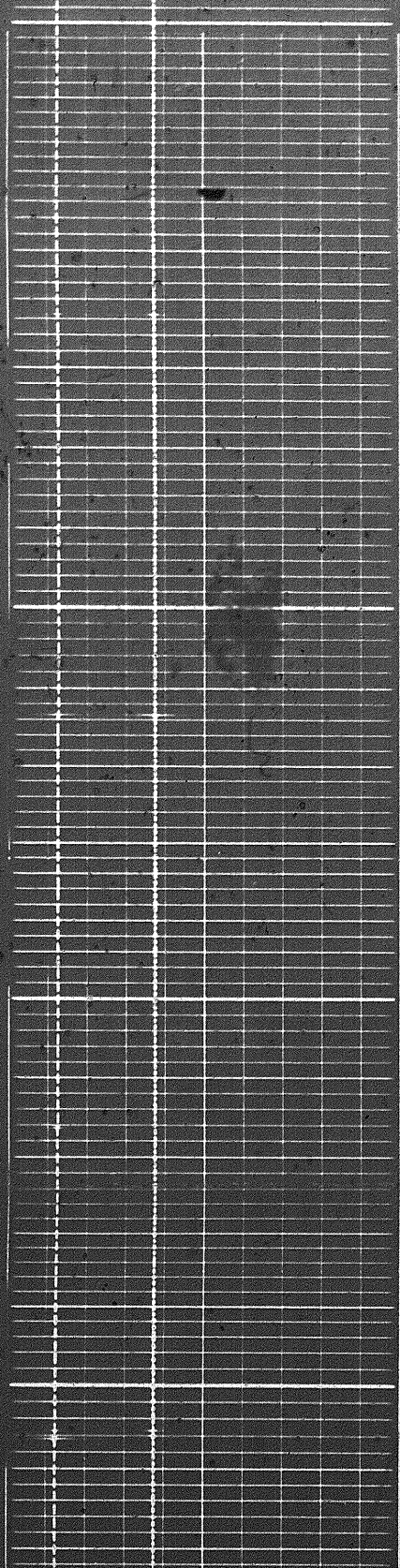
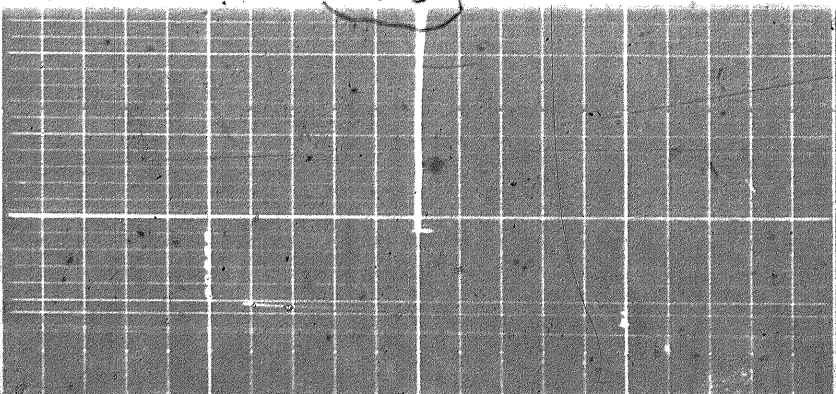
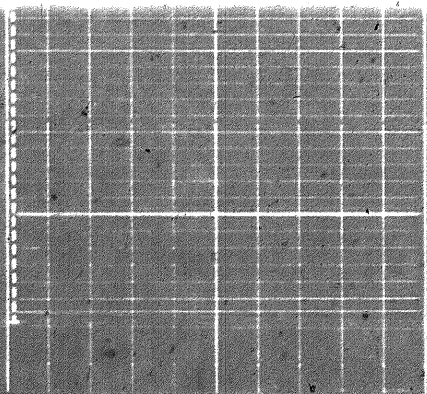
15

13

0066

12

11



12

0086

11

10

Test Panel

9

8

7

6

0000

5

3

2

1

00

Gamma Ray Cal
@ AM Units

Gamma Ray Background

66

PURPOSE

The porosity overlay is designed to identify lithology in a matrix comprised of more than one mineral. This information makes possible a more accurate porosity determination.

METHOD

The SNP log is recorded assuming a limestone matrix, with a duplicate curve recorded twelve porosity units to the right. The duplicate curve is referred to as the "Dolomite Limit". Bulk density from the FDC log is converted to limestone porosity and is superimposed on the SNP log.

INTERPRETATION

- 1) Limestone - Dolomite
 - a) Limestone. $\Phi_{FDC} = \Phi_{SNP}$. Porosities are read directly.
 - b) Dolomite $\Phi_{FDC} = \Phi_{SNP} - 12$. SNP curve readings are converted to porosity using the dolomite scaler.
 - c) Limestone - Dolomite matrix. $\Phi_{SNP} > \Phi_{FDC} > \Phi_{SNP} - 12$. Percentage of dolomite is interpolated from the relative displacement of Φ_{FDC} from the Φ_{SNP} line toward the dolomite limit line. Porosity is calculated by plotting the Φ_{SNP} and the percent dolomite on the dolomite scaler.
- 2) Other minerals

When minerals other than limestone and dolomite are present, interpretation is made using chart CP-1 of the interpretation manual.

Minerals can be identified according to the accompanying table:

LITHOLOGY IDENTIFICATION SUMMARY

A—Liquid Filled Pores

Additional requirements

Limestone	$\Phi_{FDC} = \Phi_{SNP}$
Dolomite	$\Phi_{FDC} = \Phi_{SNP} - 12$
Sand	$\Phi_{FDC} = \Phi_{SNP} + 6$

B—No Porosity

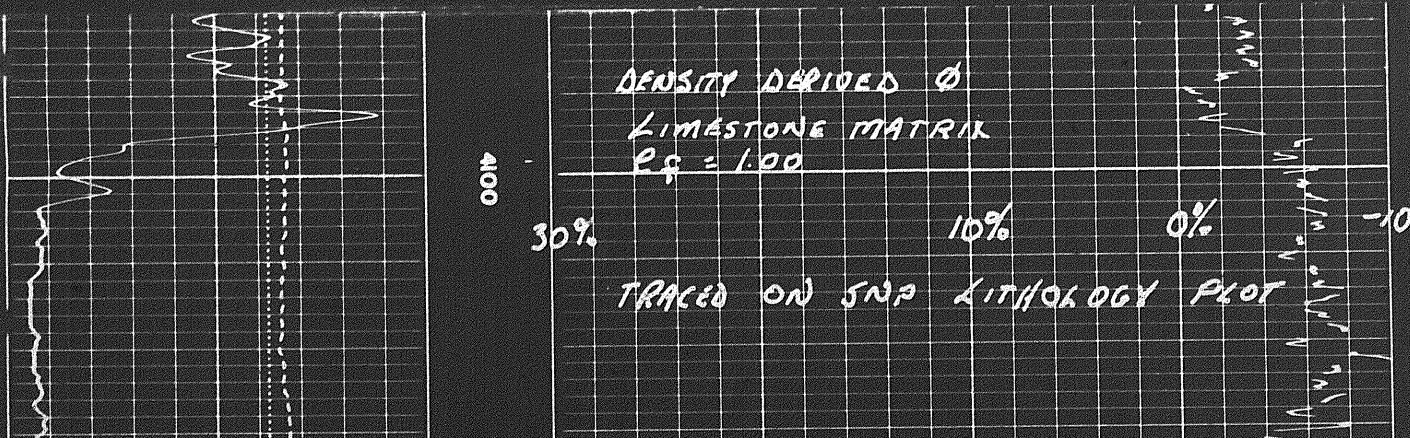
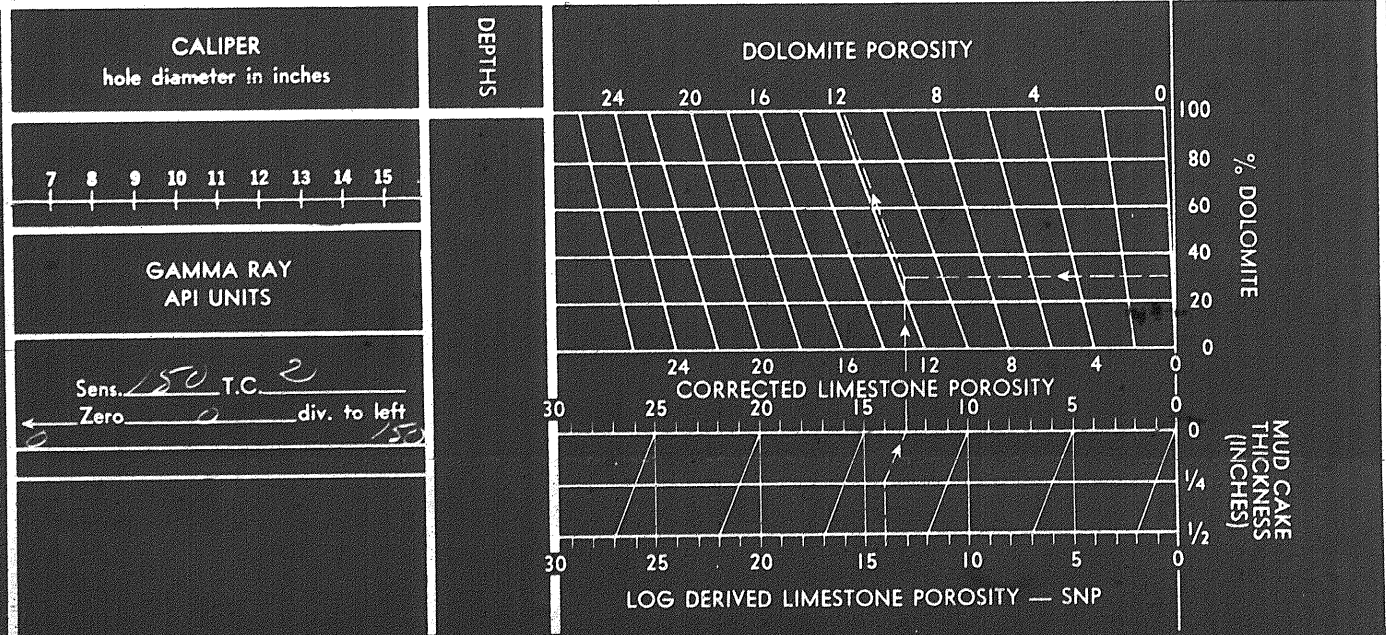
	$\Phi_{FDC} = \Phi_{SNP} + N$	Φ_{SNP}	Φ_{FDC}	ΔT_{SONIC}
Salt	$\Phi_{FDC} = \Phi_{SNP} + 39.5$	4	43.5	67
Gypsum	$\Phi_{FDC} = \Phi_{SNP} - 28$	49	21	52.5
Anhydrite	$\Phi_{FDC} = \Phi_{SNP} - 16$	-1	-17	50
Sulphur	$\Phi_{FDC} = \Phi_{SNP} + 40$	0	40	122
Shale	$\Phi_{FDC} = \Phi_{SNP} - N$			

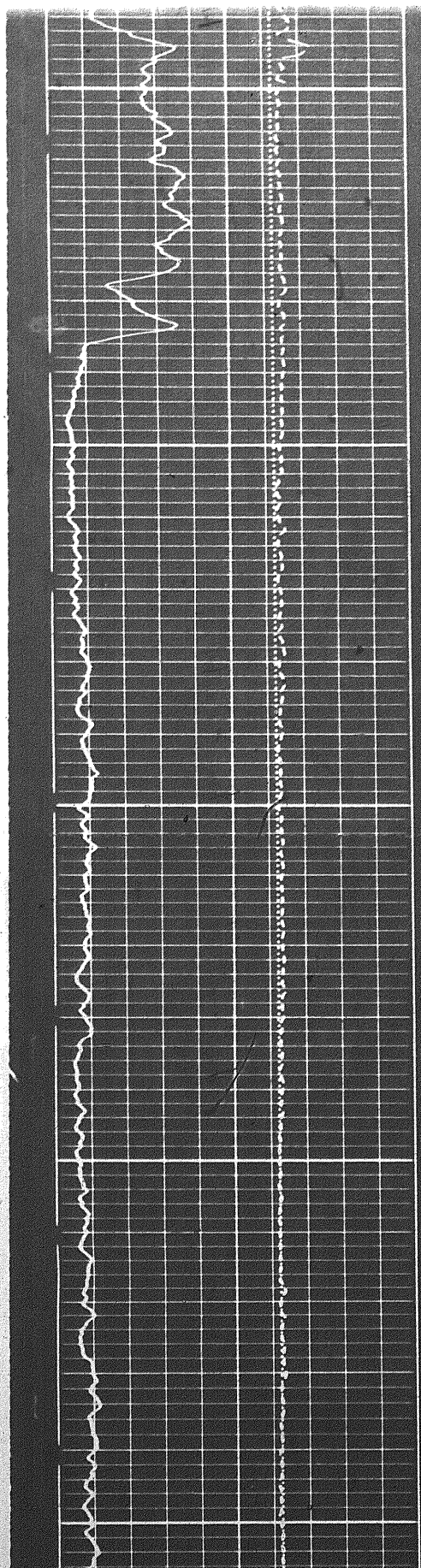
(N is variable - confirm with gamma ray)

COLOR LEGEND

	Sand
	Shale
	Limestone
	Dolomite
	Anhydrite
	Salt

Remarks:

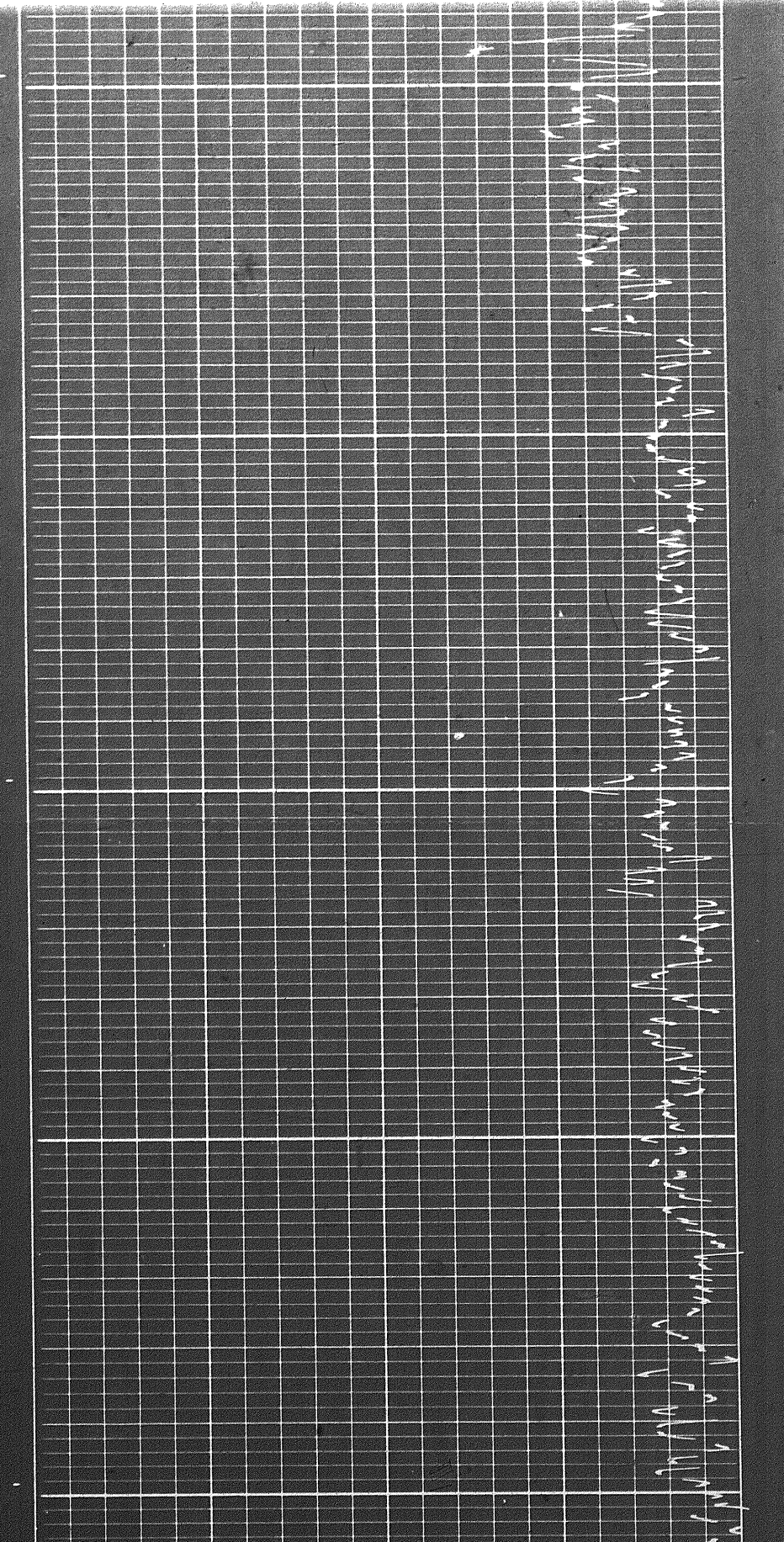


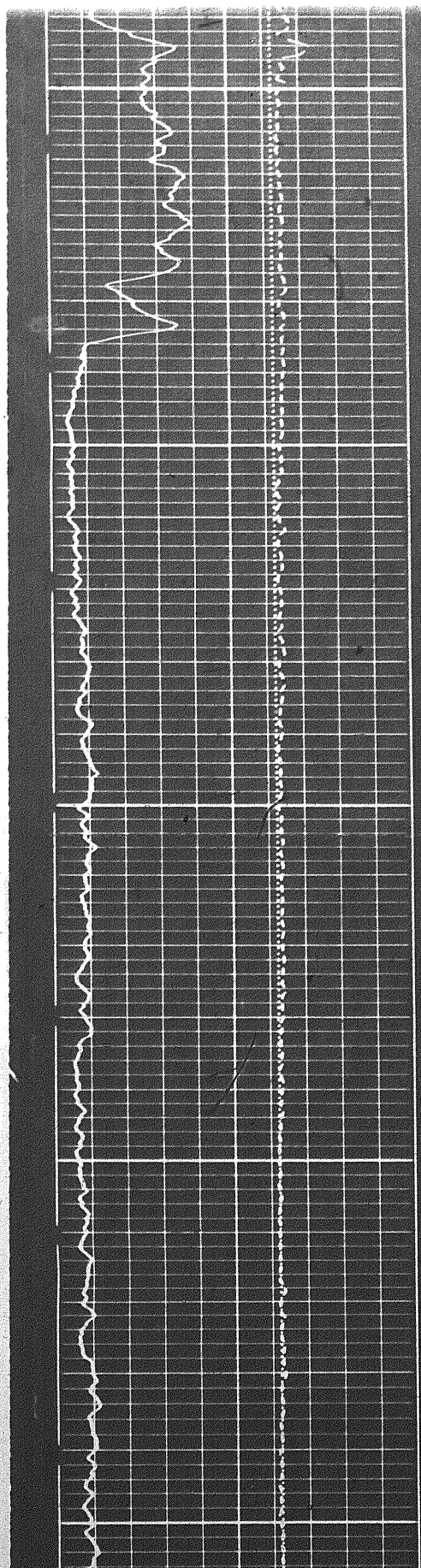


4200

4300

4400

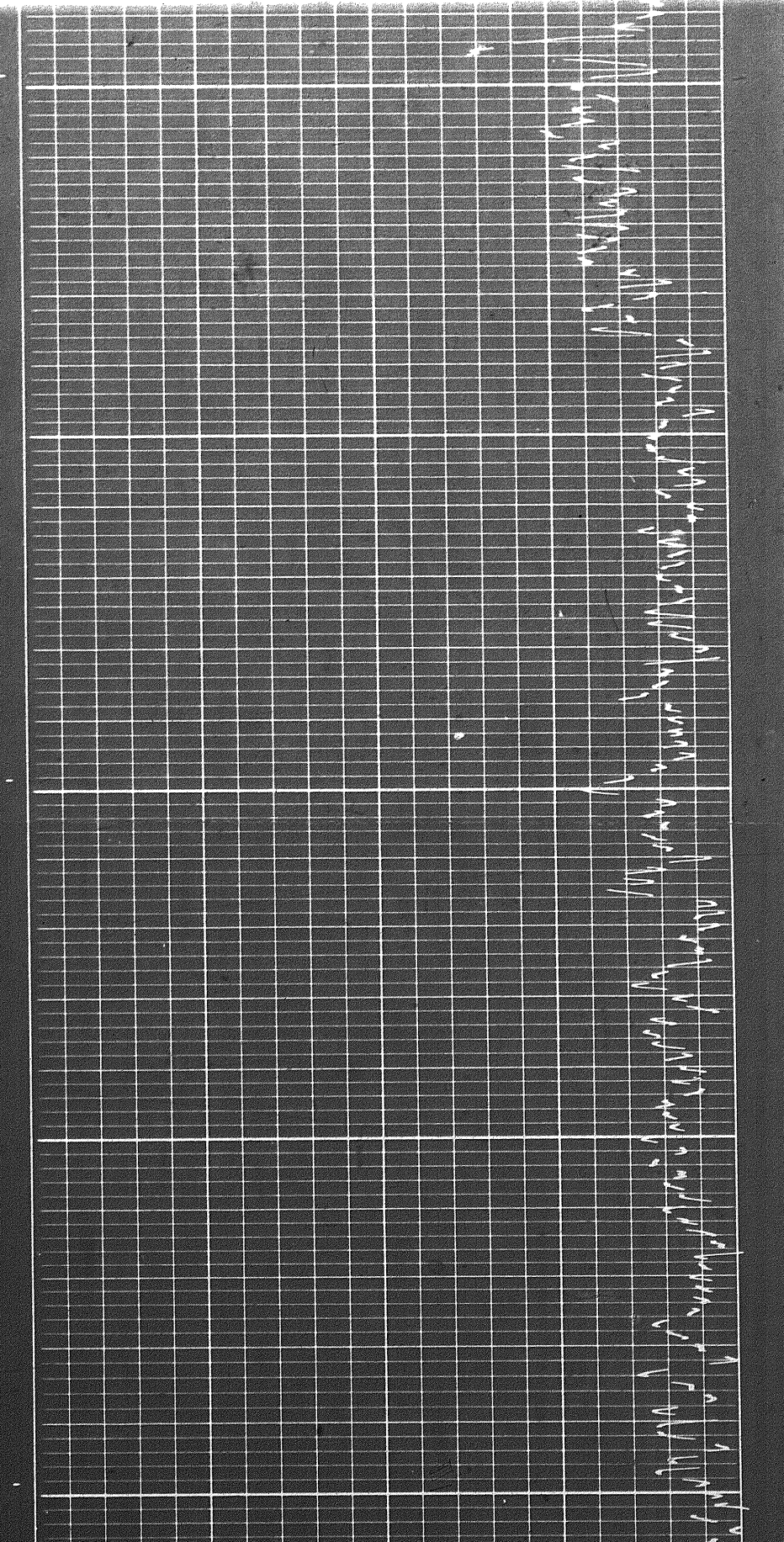


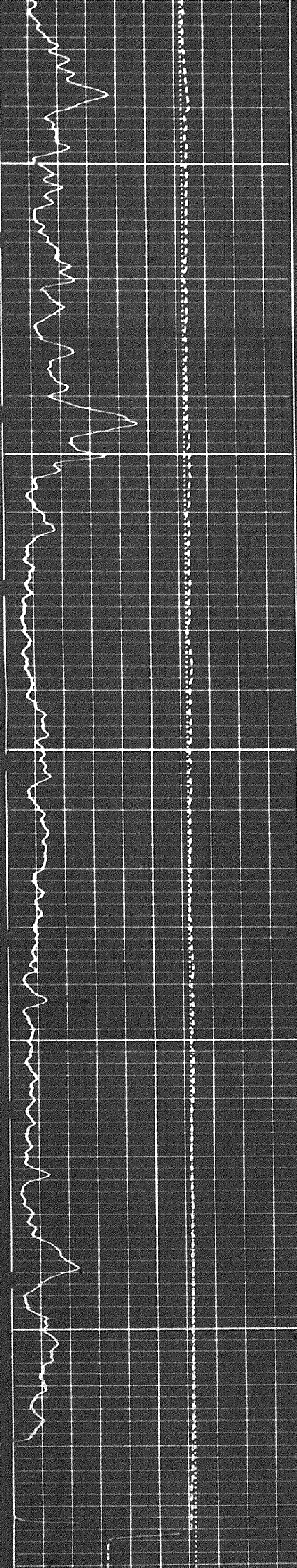


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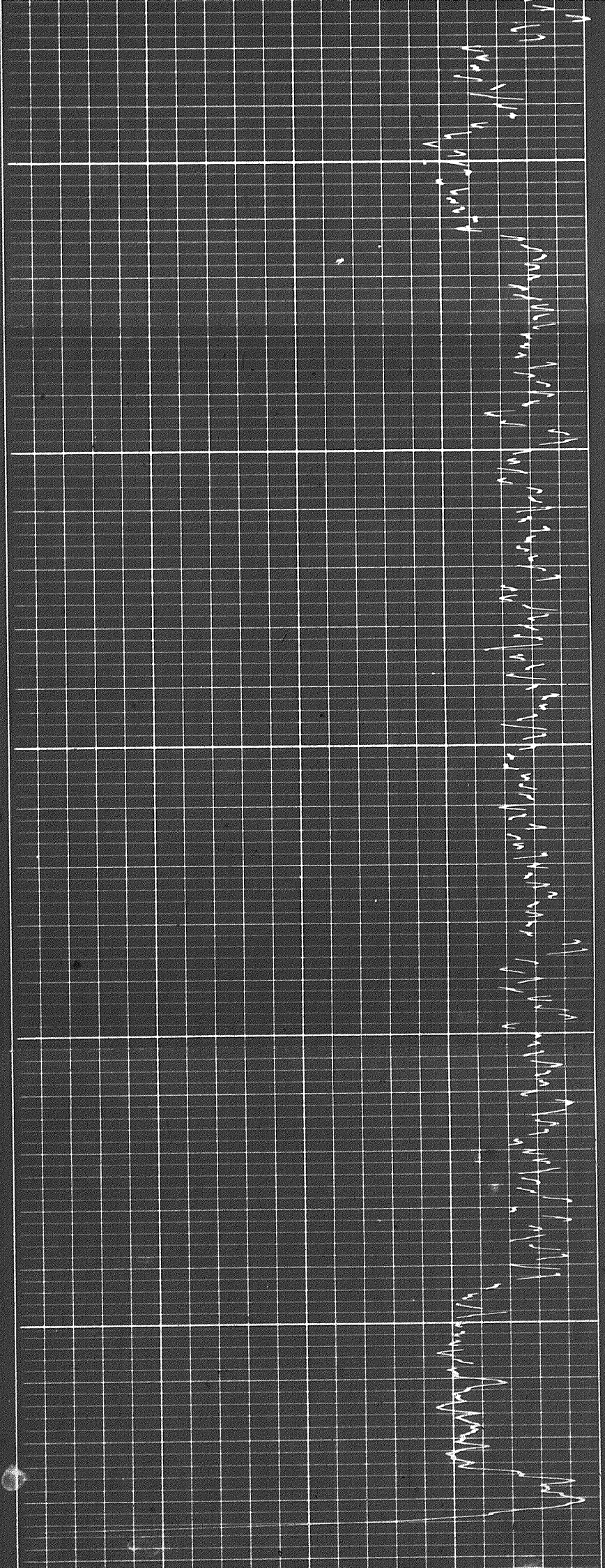
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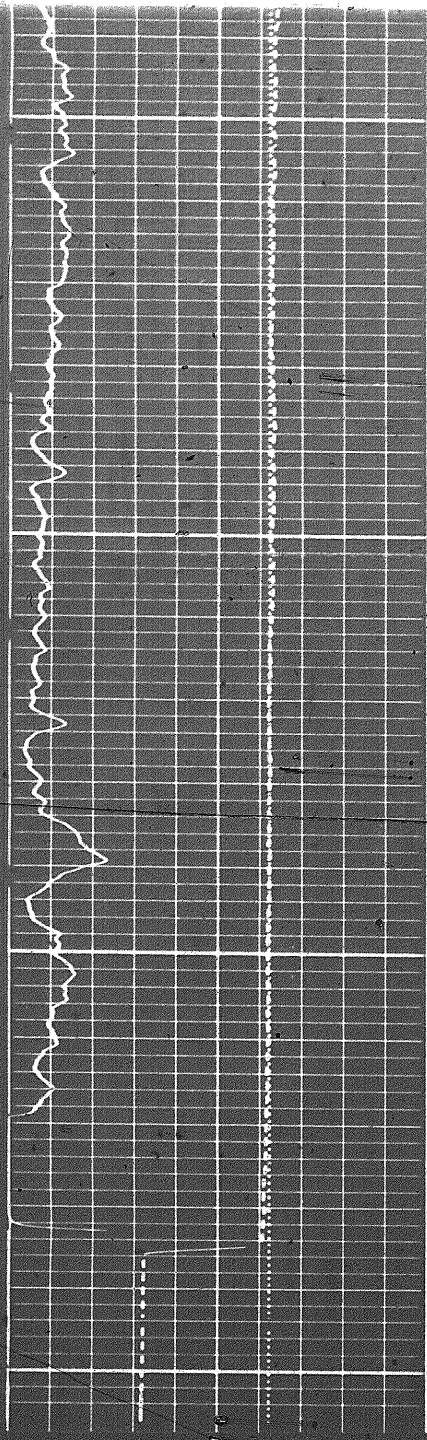




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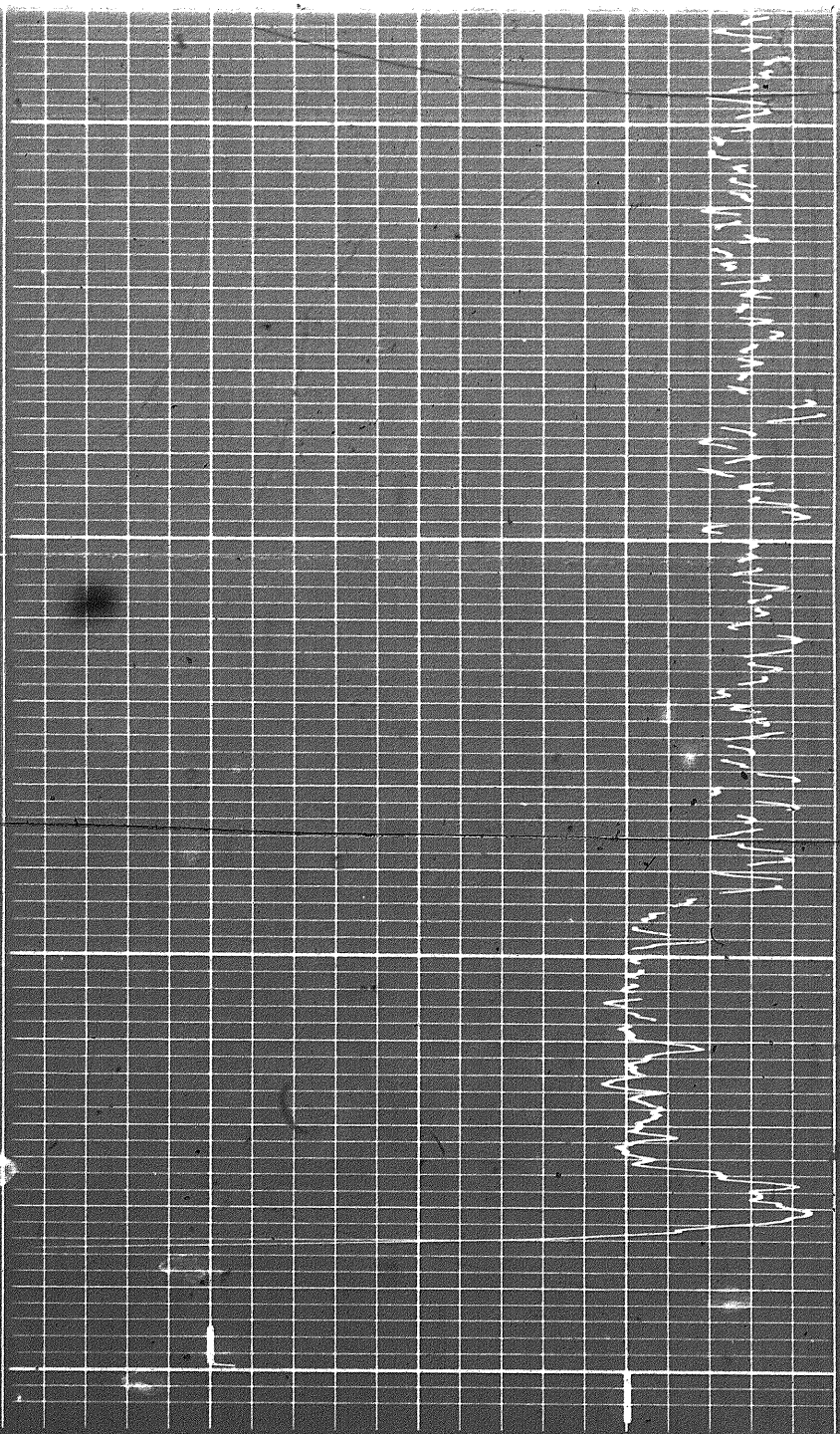
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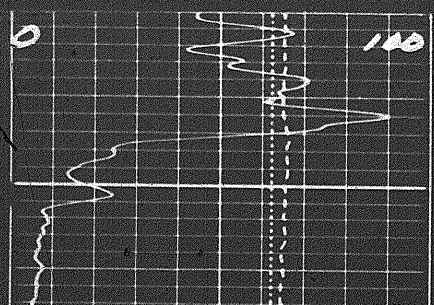
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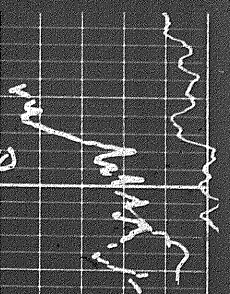
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Run 2



4100

LITHOLOGY PLOT
 SNP LIMESTONE @ RECORDED
 FOX LIMESTONE @ TRACED



LITHOLOGY PLOT

SMP LIMESTONE ϕ RECORDED

FOX LIMESTONE ϕ TRACED

ϕ UNITS

30%

20%

10%

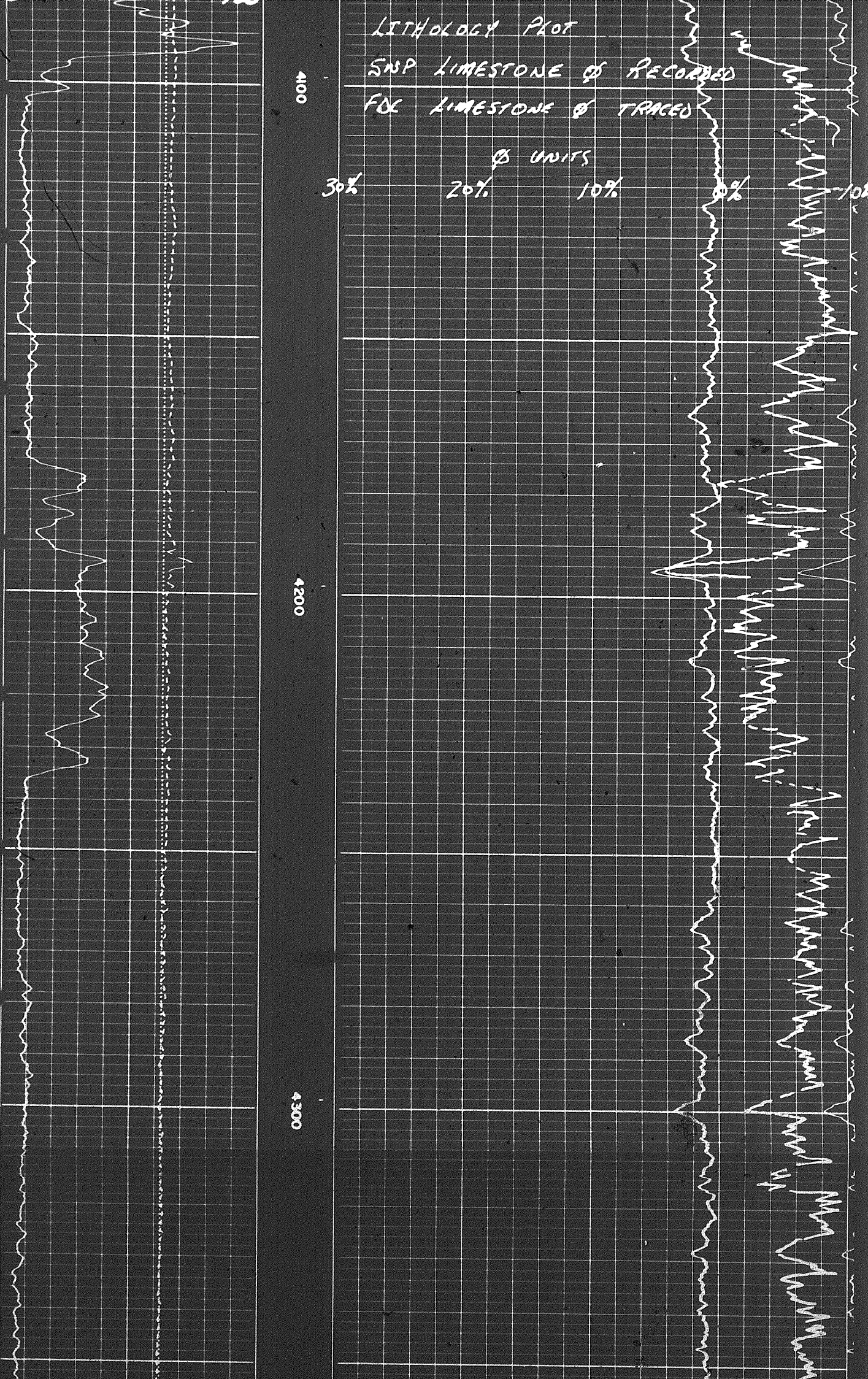
0%

10%

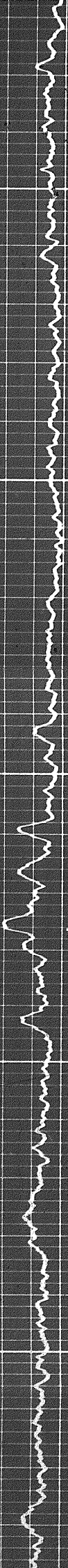
4100

4200

4300

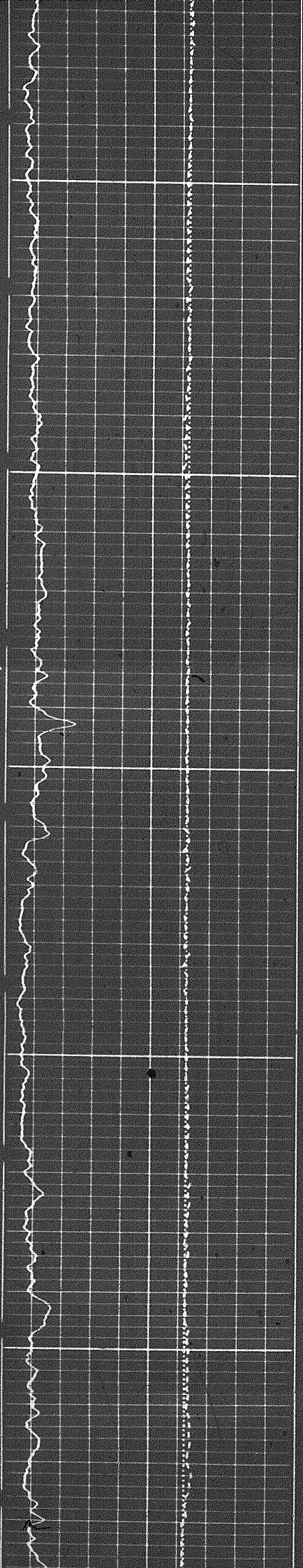


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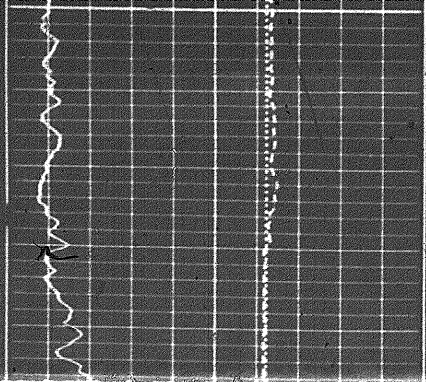
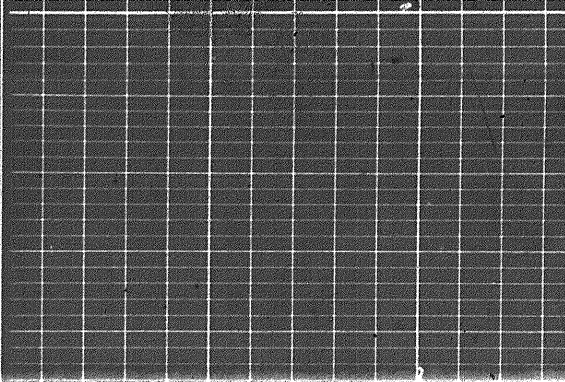
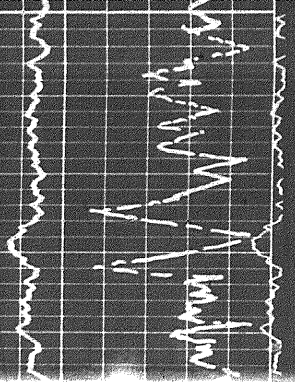


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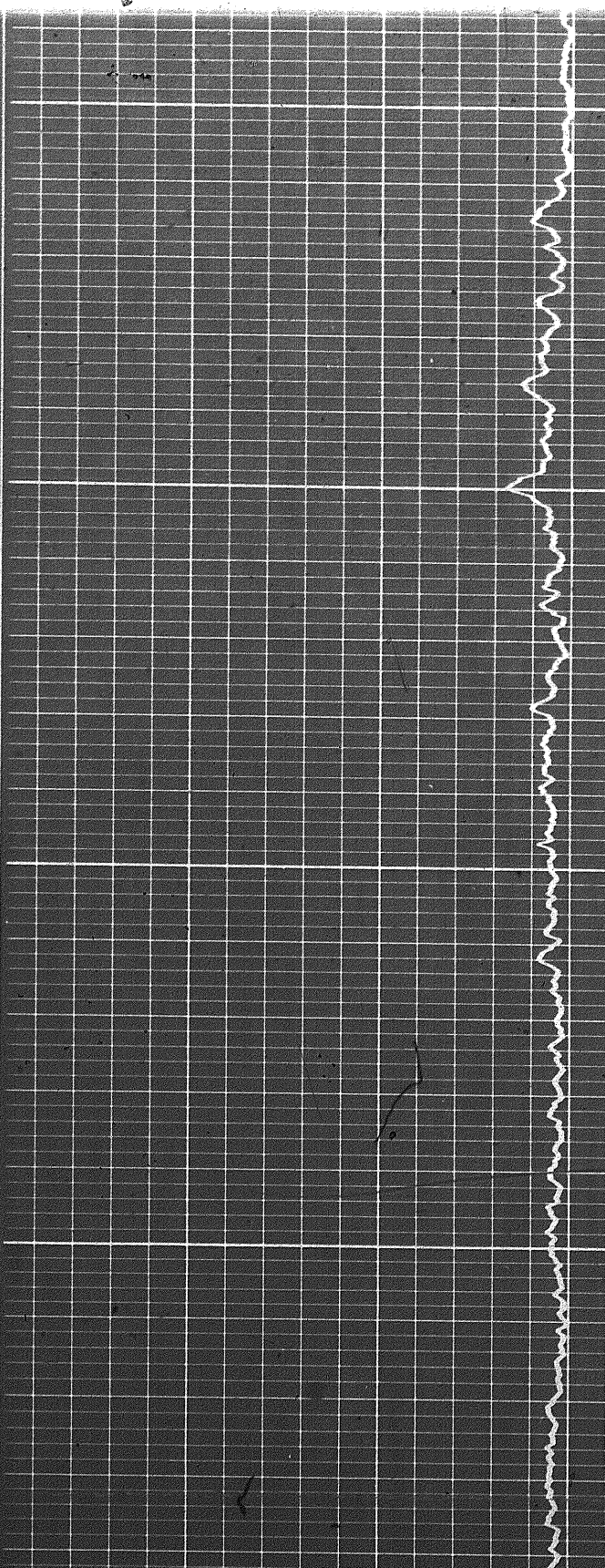
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1/1/2000

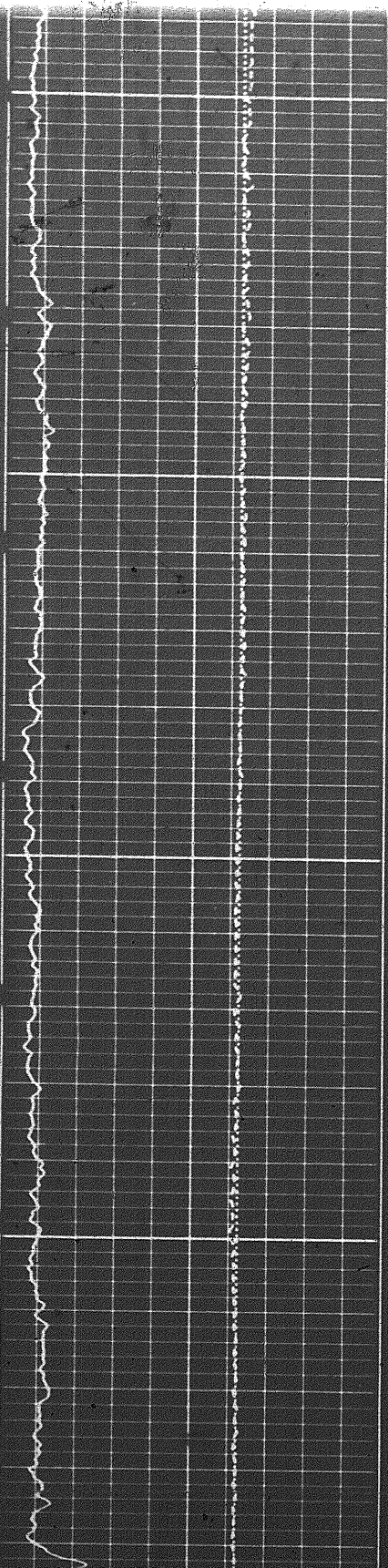


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1/1/2000



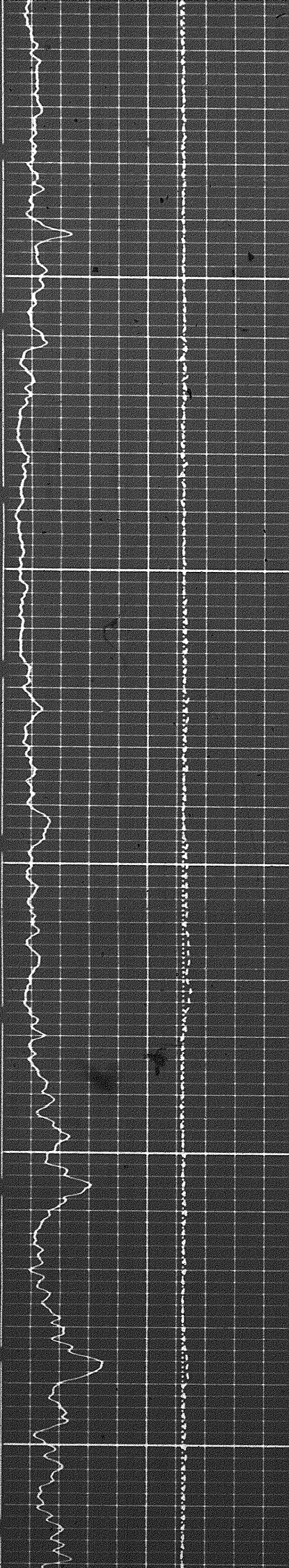
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4:40



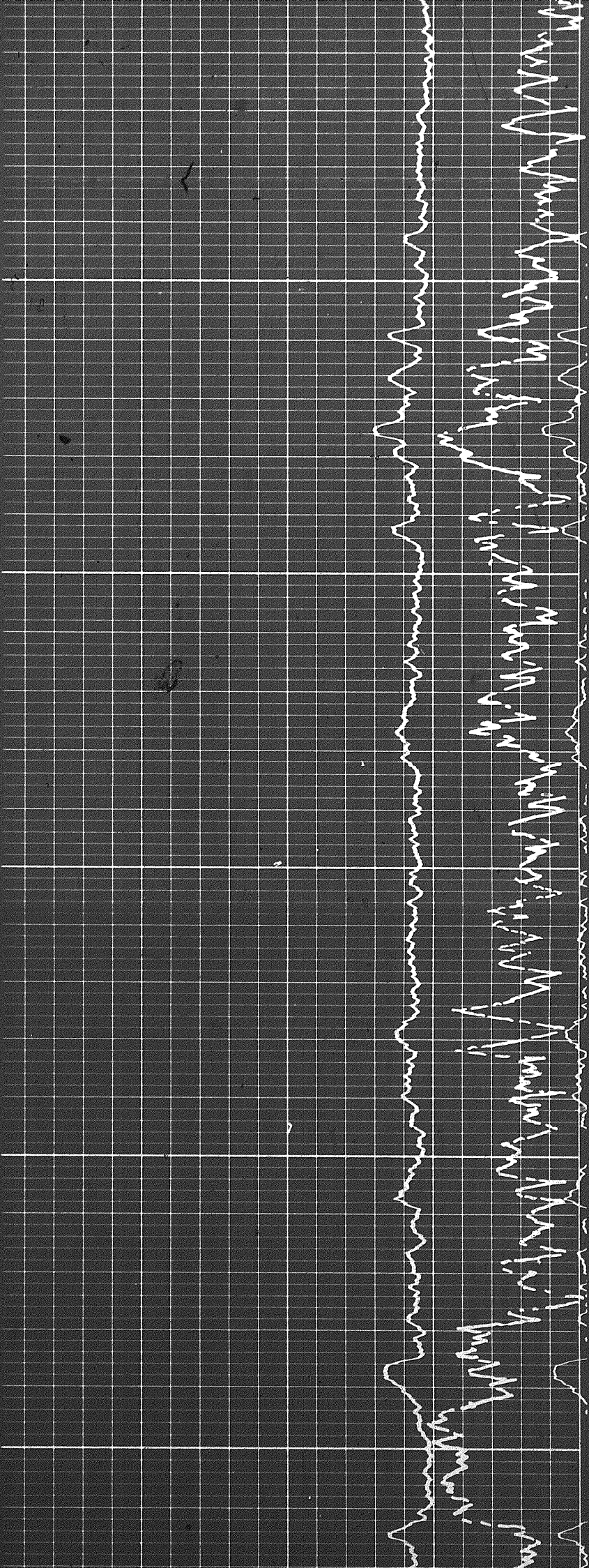
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00095



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4600





4700

4800