

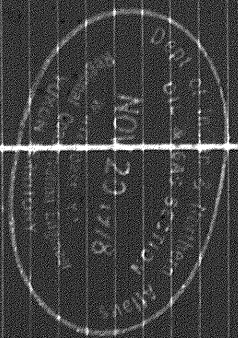
Schlumberger

**SIMULTANEOUS  
COMPENSATED NEUTRON-  
FORMATION DENSITY**

PROVINCE YUKON  
FIELD WILDCAT  
WELL COLUMBIA ET AL. NOTANEELE  
YT E-37  
COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD  
WELL COLUMBIA ET AL. NOTANEELE  
FIELD WILDCAT  
PROVINCE YUKON  
LOCATION 60° 06' 27" N 141° 07' 16" W  
Permeant Datum SL ELEV 2013  
Log Measured From NE 75 Ft Above Perm. Datum  
ELEV. KB  
GL  
CBF

Date	10/21/18
Run No	TWO
First Reading	18739.0
Last Reading	9965.0
Feet Measured	3874.9
Depth Reached	13740.0
Bottom Driller	5250.0
Csg SOC	9965.0
Csg Driller	9990.0
Mud Nature	421 POLY
Dens	1.43
Visc	10+
Mud pH	11.5
Water Loss	11.5
Res	at
Rmf	at
at BHT	at
Rmc	at
ppm Cl	44,000
Bit Size	8 1/2"
Equipment Type	
Op Rig Time	
Truck No	
Recorded By	
Witness	



REMARKS  
Drilling Stopped 9900 / 3 1/2" Circulation Stopped 2400 / 10 min Tool on Bottom 1814 / 11 min 1st Run Service Order # 30833 B.H.T. 310

Time Entering Hole	1735 / 11		
Time Bottom Reached	1814 / 11		
Time Last Off Bottom	1832 / 11	BHT No 1	310 °F
Distance TD to Thermometer	30 ft	BHT No 2	310 °F
Time Out Of Hole	2118 / 11		
Mud Resistivities	Rm No 1	0.121 ohm m @ 70 °F = 0.027 ohm m @ BHT	
	Rm No 2	0.116 ohm m @ 70 °F = 0.026 ohm m @ BHT	
	Rm No 3	0.120 ohm m @ 70 °F = 0.027 ohm m @ BHT	
Rw from Drill Stem Test	DST No.	Rw =	ohm m @ °F
	DST No.	Rw =	ohm m @ °F
	DST No.	Rw =	ohm m @ °F
			LOG TAPED X
			Yes No

Run No.	CNP	CNC	CNB	NSR	SGC	CAL	Decent Spg. Used
	A 636	A 425	A 162	68 1127	EA 1439	-	X Yes No
							Yes No
							Yes No

Run No.	PGP	PGC	PGS	PGD	GSR	PND	NSR	SFT-116	SFT-106
TWO	EA 188	EA 1079	E 308	D 433	D 476	-			

Run No.	Gamma Ray			CNL - Before Log - ACPS		CNL - After Log - ACPS	
	API Scale	Background CPS	Total CPS	Long Spacing	Short Spacing	Long Spacing	Short Spacing
TWO	0-165			RATIO	2.19	RATIO	2.16

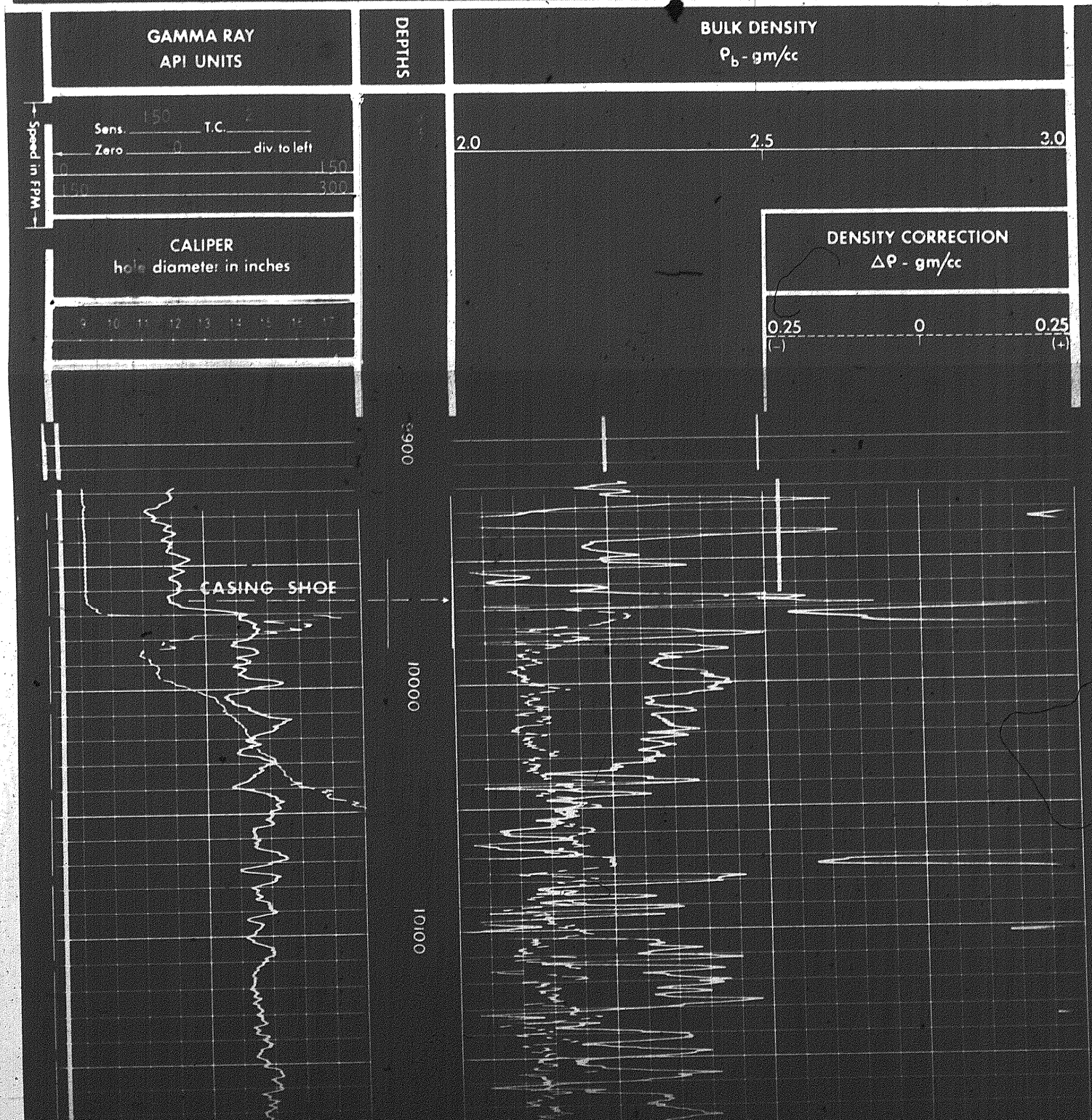
CALIBRATION DATA

Run No.	API Scale	Background CPS	Total CPS	Long Spacing	Short Spacing	Long Spacing	Short Spacing
TWO	0-165			RATIO 2.19		RATIO 2.16	

CALIBRATION DATA								
Run No.	Before Log - SNP - After Log				Before Log - FDC - After Log			
	Drawer in	Drawer out	Drawer in	Drawer out	P1	P2	P1	P2
TWO					424	720	424	720

LOGGING DATA										
Run No.	General			Speed Ft./Min.	Tc	Gamma Ray		CNL Selectors		Porosity Scale
	From	Depths To	API Scale			Matrix	Auto Hole Size Corr.	Hole Size Setting (If not auto)		
TWO	TD	CSG	30	2	0 - 150	CH LIMESTONE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	-	15-12-45	

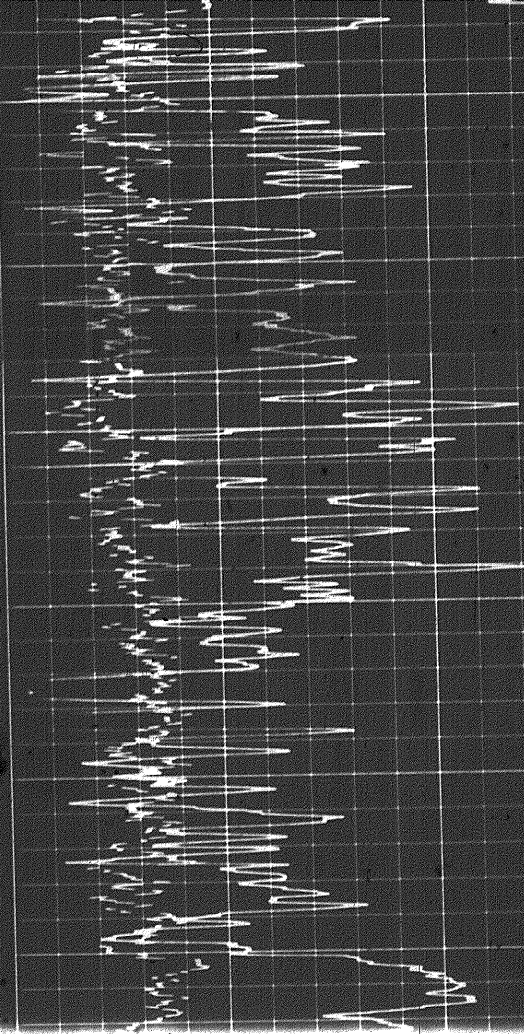
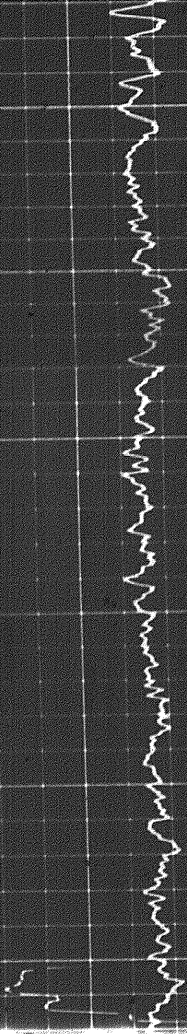
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.



10100

10200

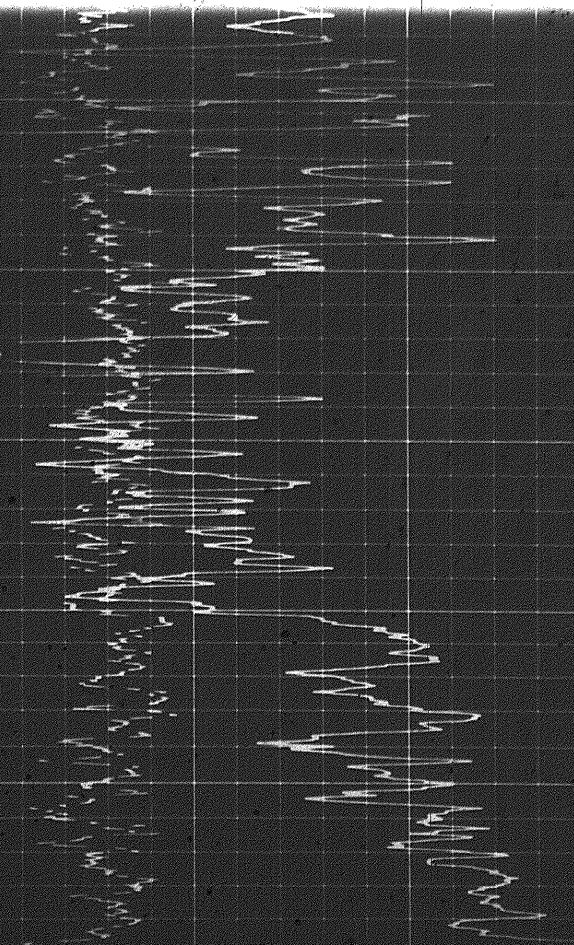
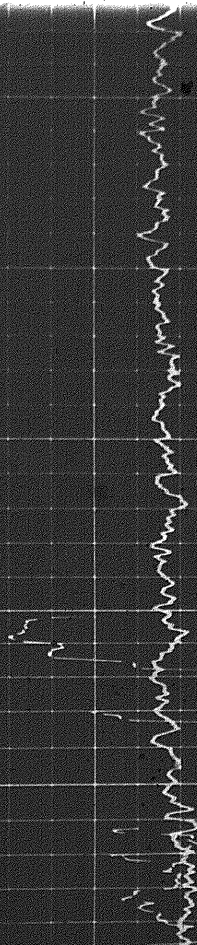
10300

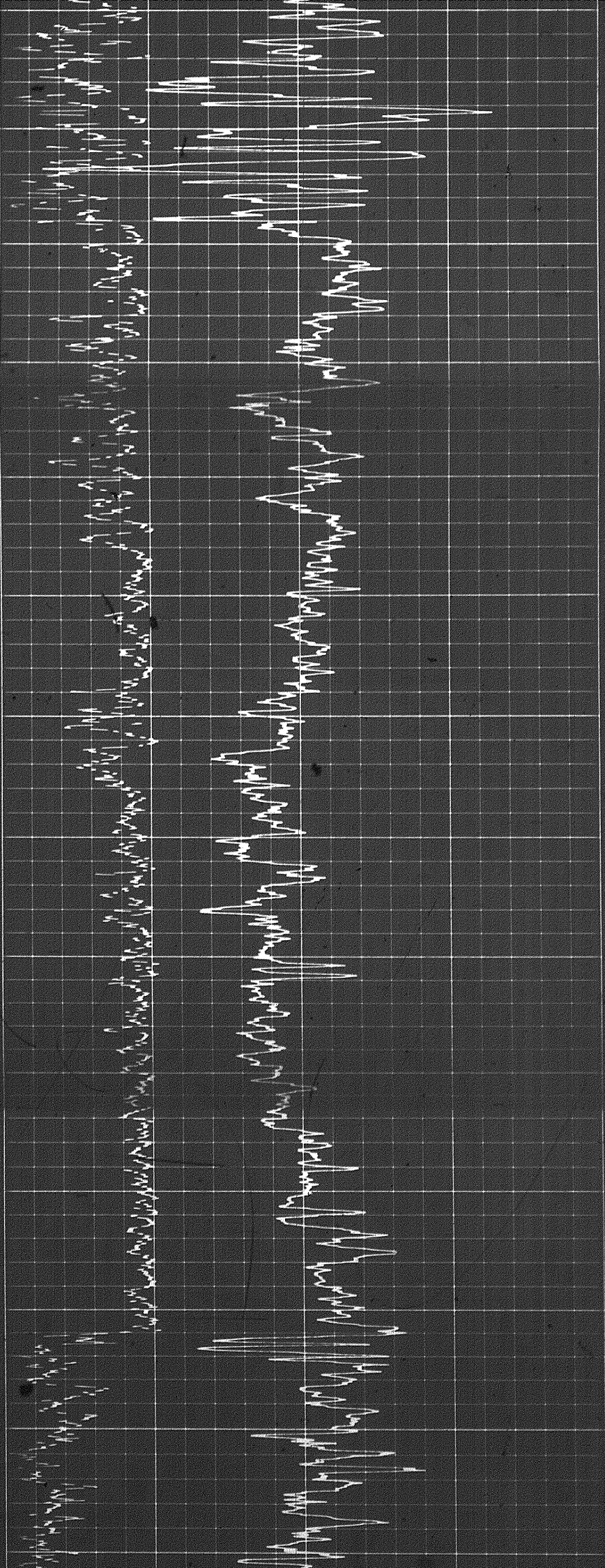


10200

10300

10400





11000

11100

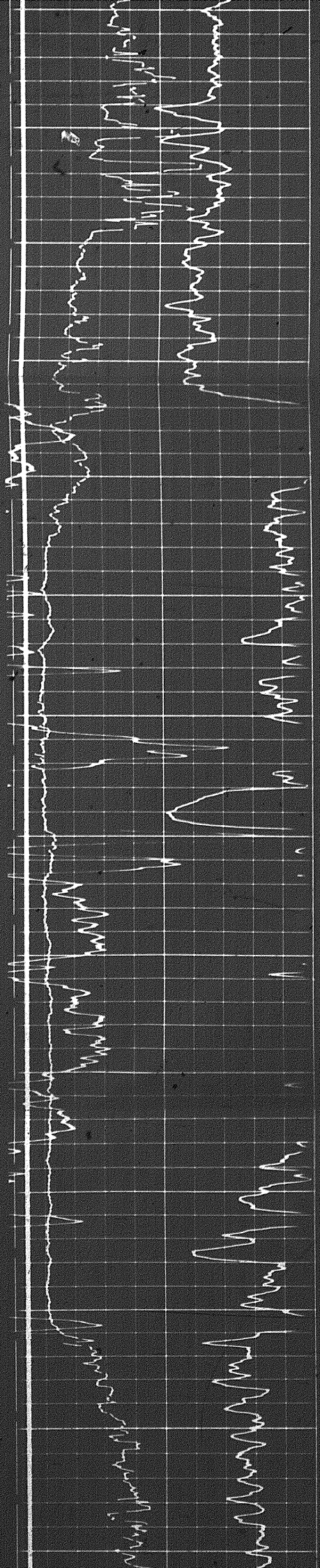
11200

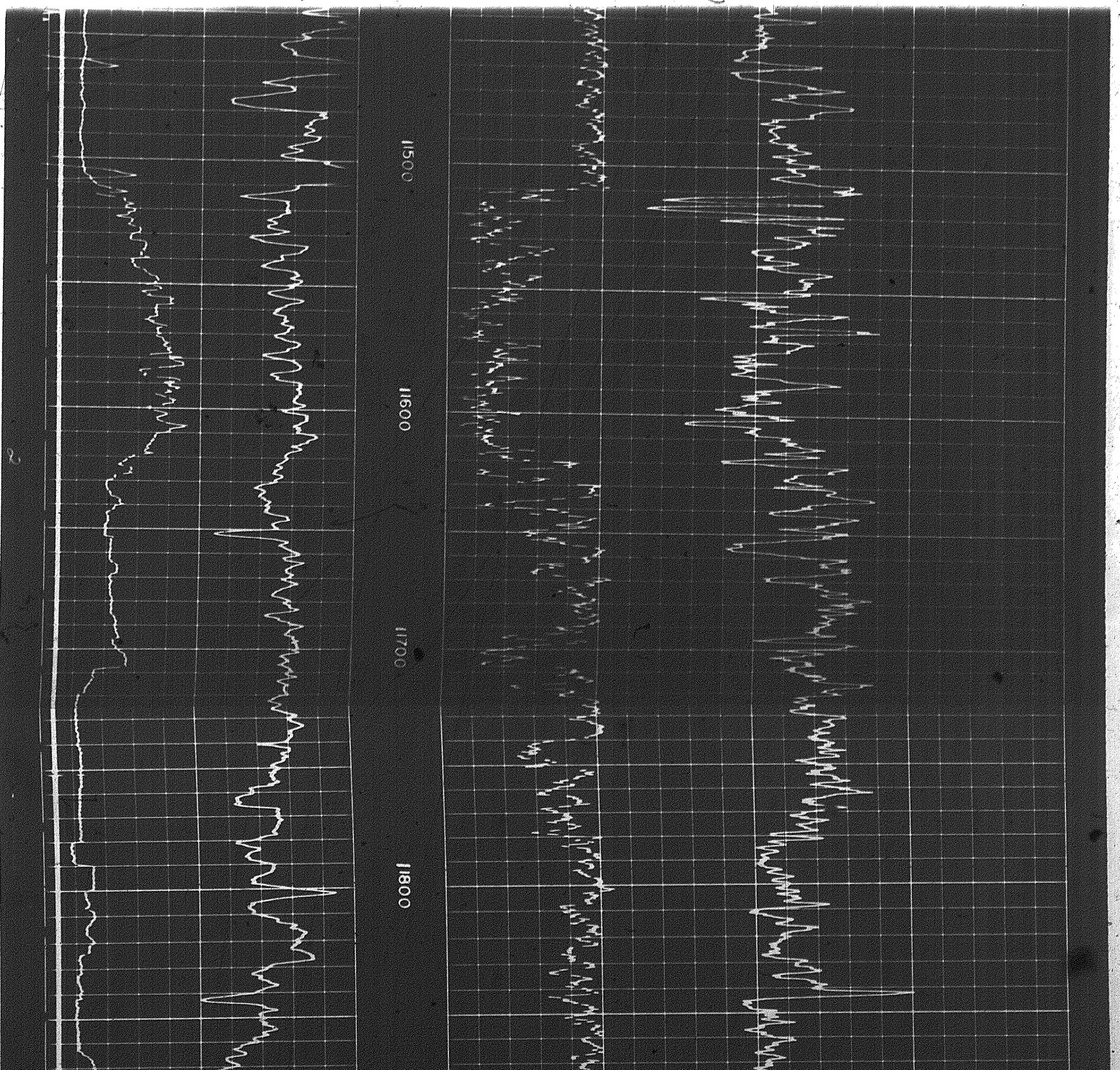
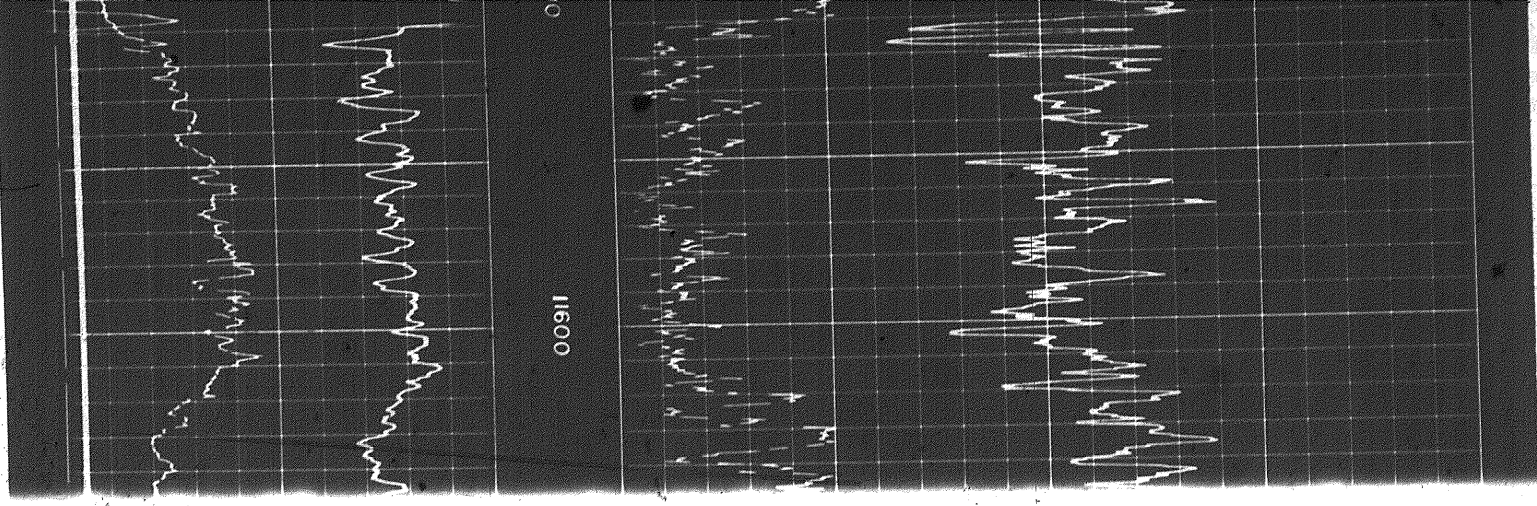
11300

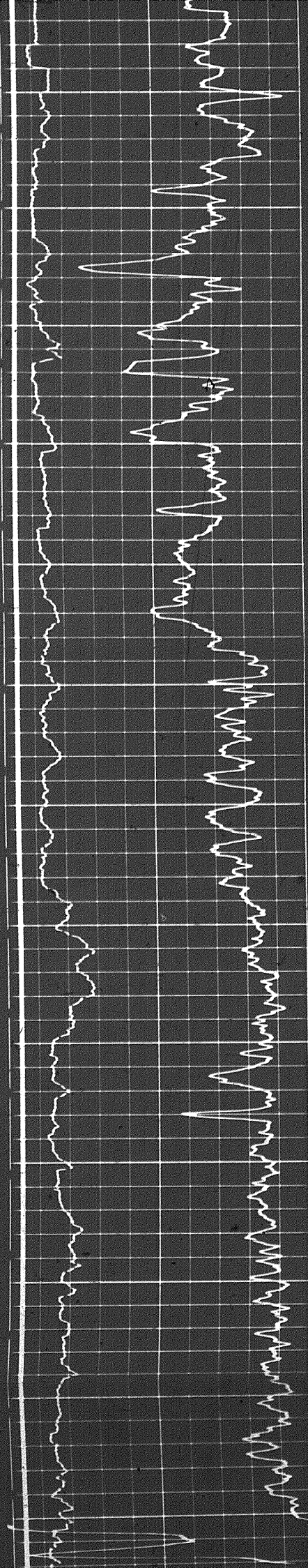
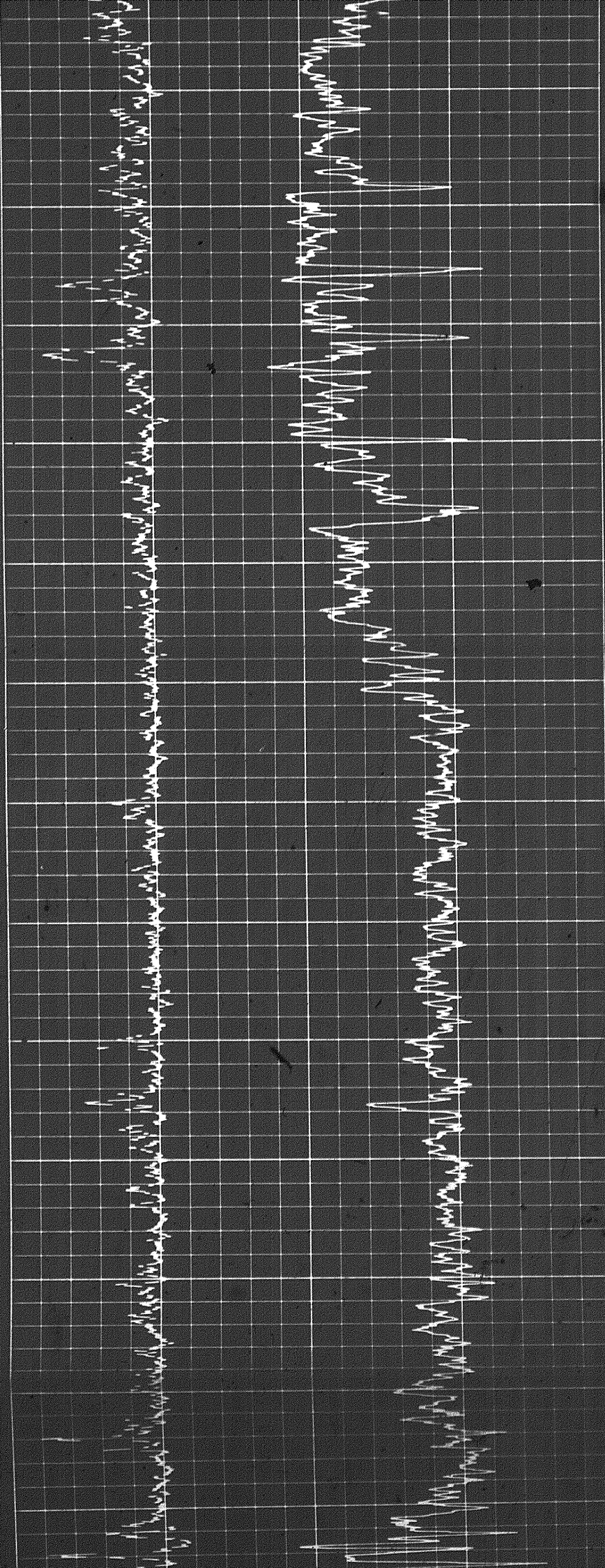
11400

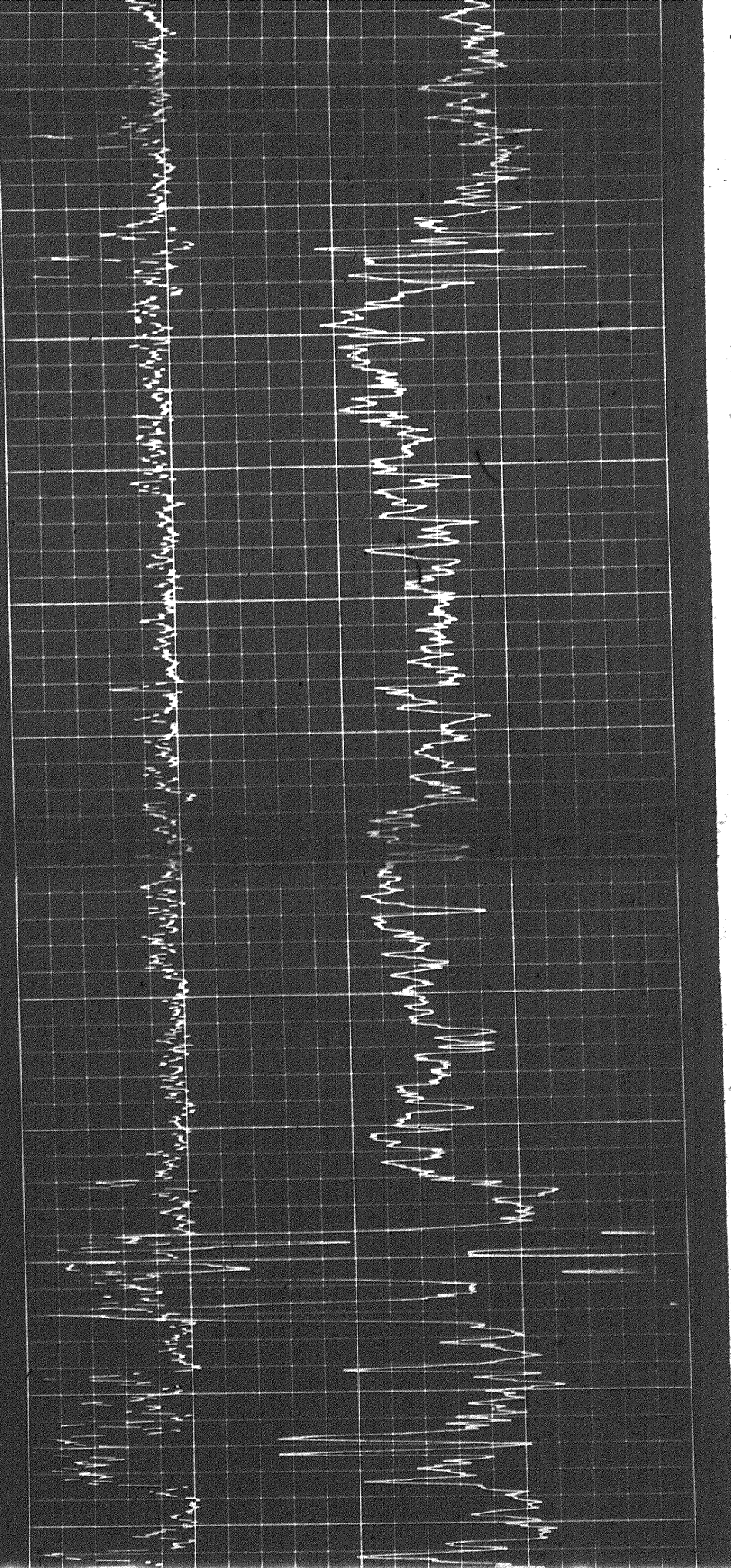
11500

11600









12400

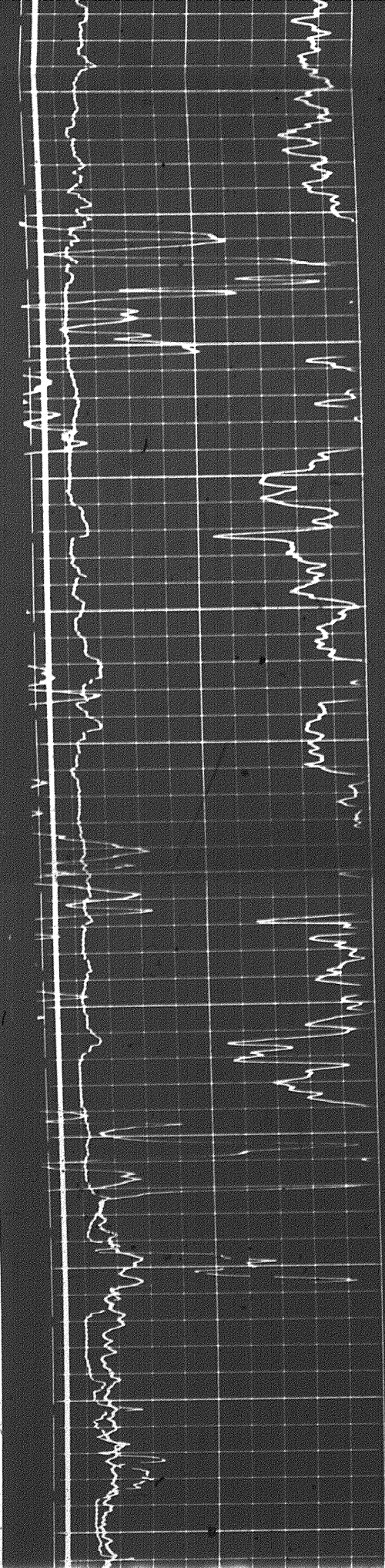
12500

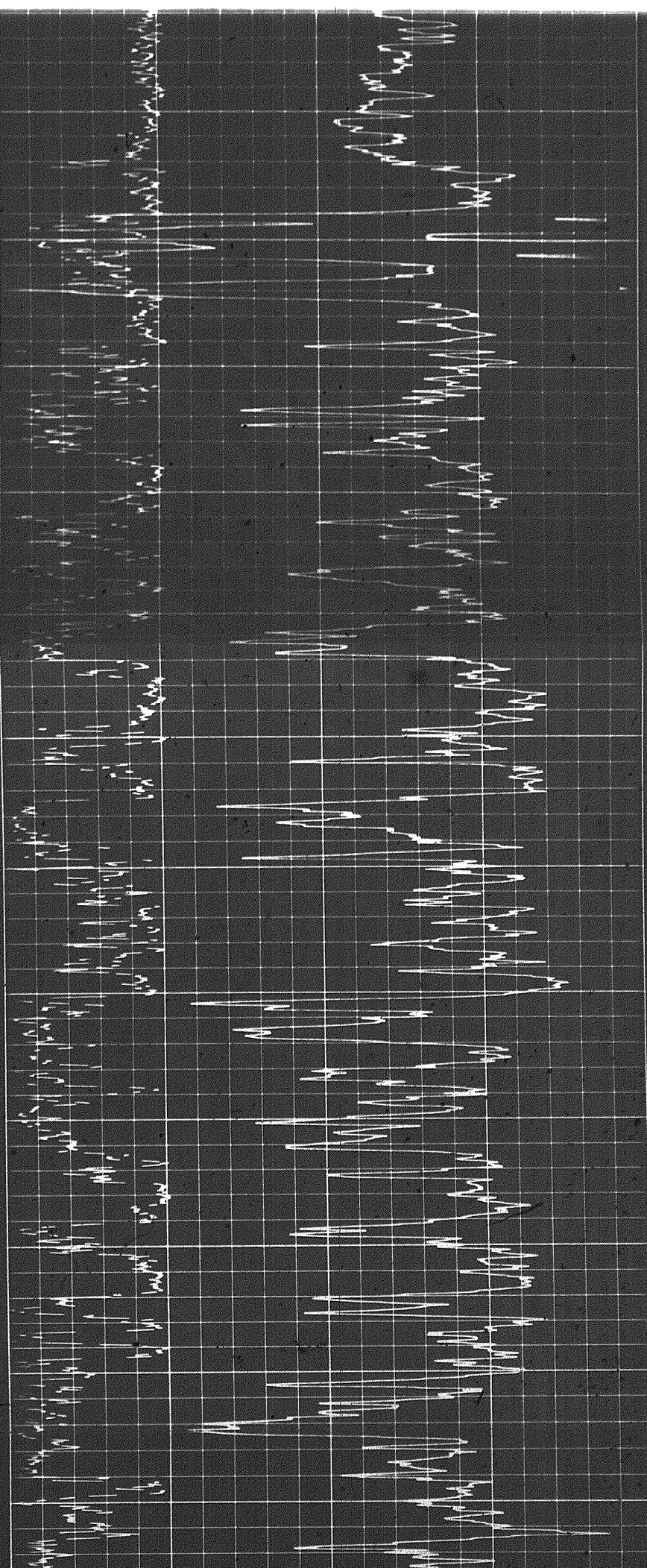
12600

12700

12800

12900





12800

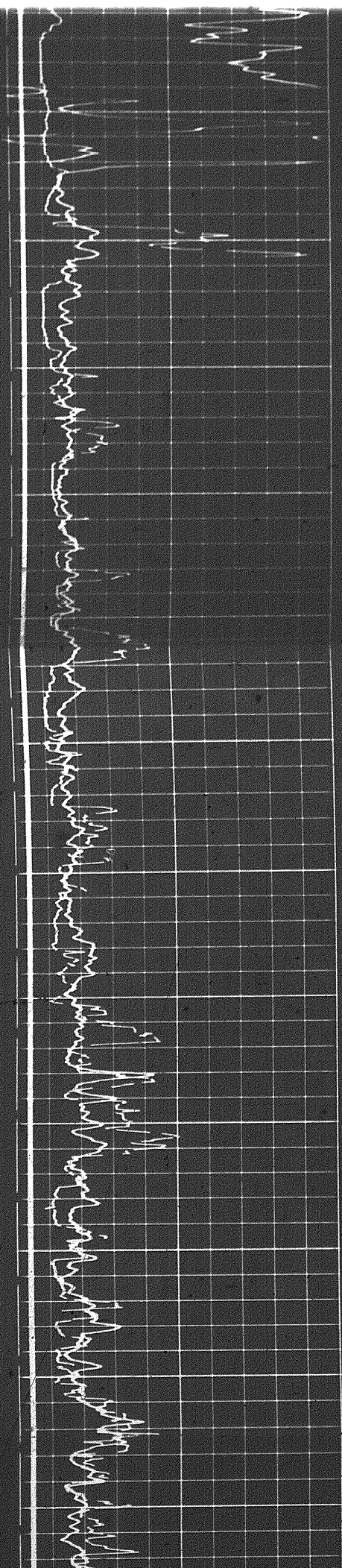
12900

13000

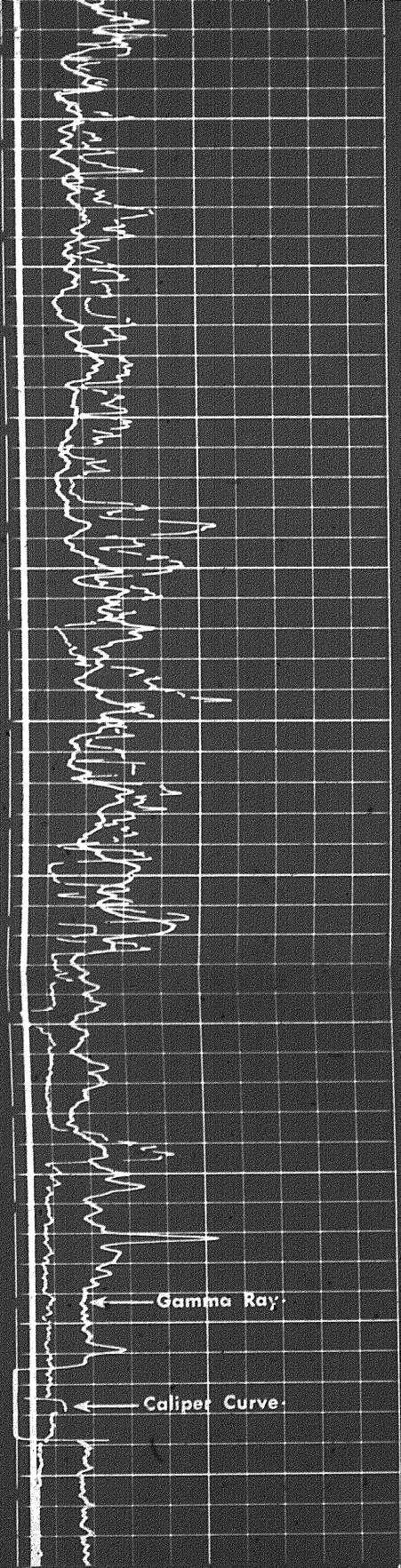
13100

13200

13300







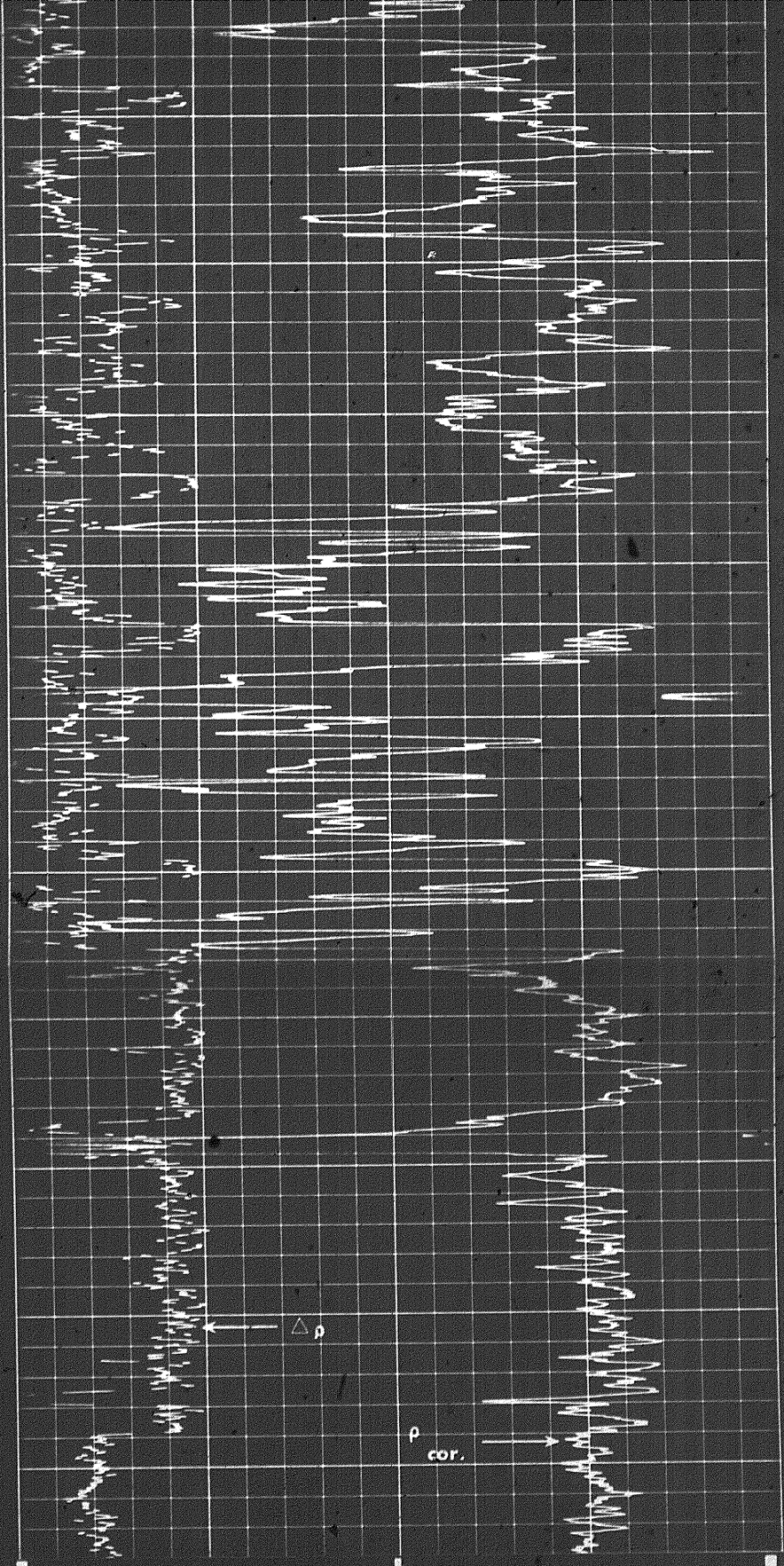
13300

13400

13500

13600

13700



DENSITY CORRECTION  
 $\Delta \rho$  - gm/cc



BULK DENSITY

CALIPER  
hole diameter in inches

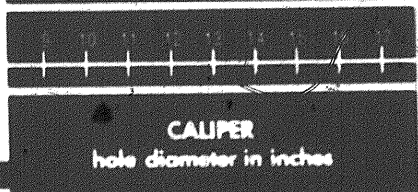
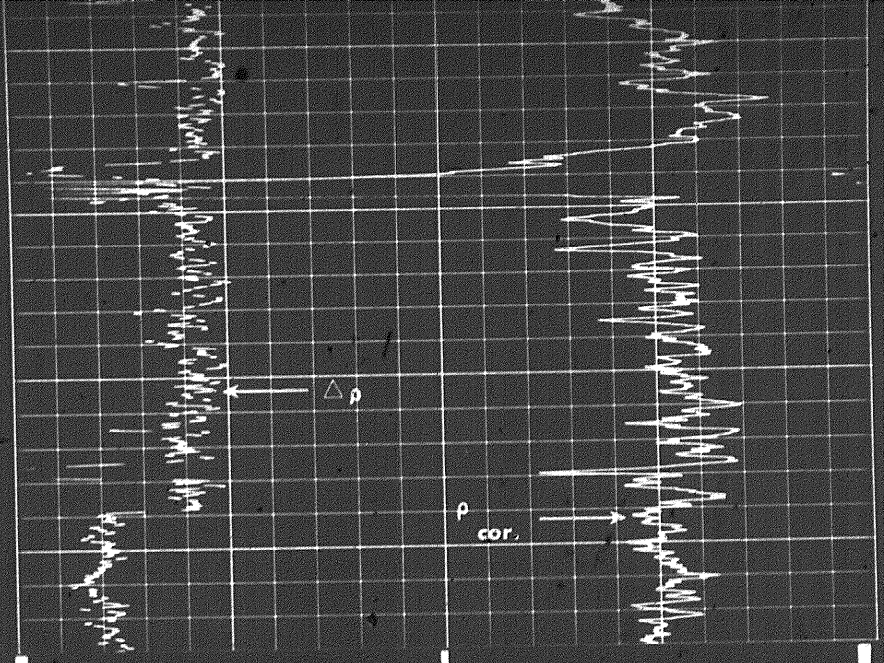
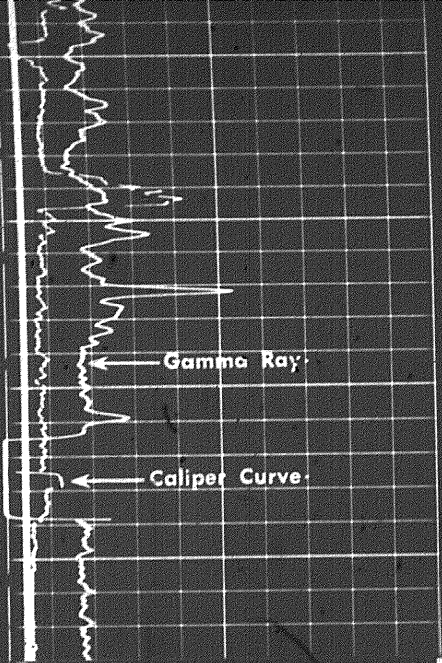
Sp. T.C.  
Zero div. to left

GAMMA RAY

DE

Spaced in 1/16"

13600  
13700



**CALIPER**  
hole diameter in inches

Sens. \_\_\_\_\_ T.C. \_\_\_\_\_  
Zero \_\_\_\_\_ div. to left

**DENSITY CORRECTION**  
 $\Delta \rho - gm/cc$



**GAMMA RAY**  
API UNITS

**DEPTH**

**BULK DENSITY**  
 $\rho_b - gm/cc$

**DETAIL LOG**  
5" = 100'

**CALIPER**  
hole diameter in inches

**DEPTH**

**POROSITY (%)**

**GAMMA RAY**  
API UNITS

**DEPTH**

**DENSITY POROSITY**  
 $\rho_{MATRIX}$  \_\_\_\_\_ gm/cc  $\rho_{FLUID}$  \_\_\_\_\_ gm/cc

**GAMMA RAY**  
API UNITS

**DEPTH**

**NEUTRON POROSITY**  
\_\_\_\_\_ MATRIX

Sens. \_\_\_\_\_ T.C. \_\_\_\_\_  
Zero \_\_\_\_\_ div. to left

Sens. \_\_\_\_\_ T.C. \_\_\_\_\_  
Zero \_\_\_\_\_ div. to left

1311X

CALIPER  
hole diameter in inches

DEPTH

POROSITY (%)

DENSITY POROSITY

$\rho_{\text{MATRIX}}$  gm/cc  $\rho_{\text{FLUID}}$  gm/cc

GAMMA RAY  
API UNITS

NEUTRON POROSITY

MATRIX

Sens. \_\_\_\_\_ T.C. \_\_\_\_\_  
Zero \_\_\_\_\_ div to left

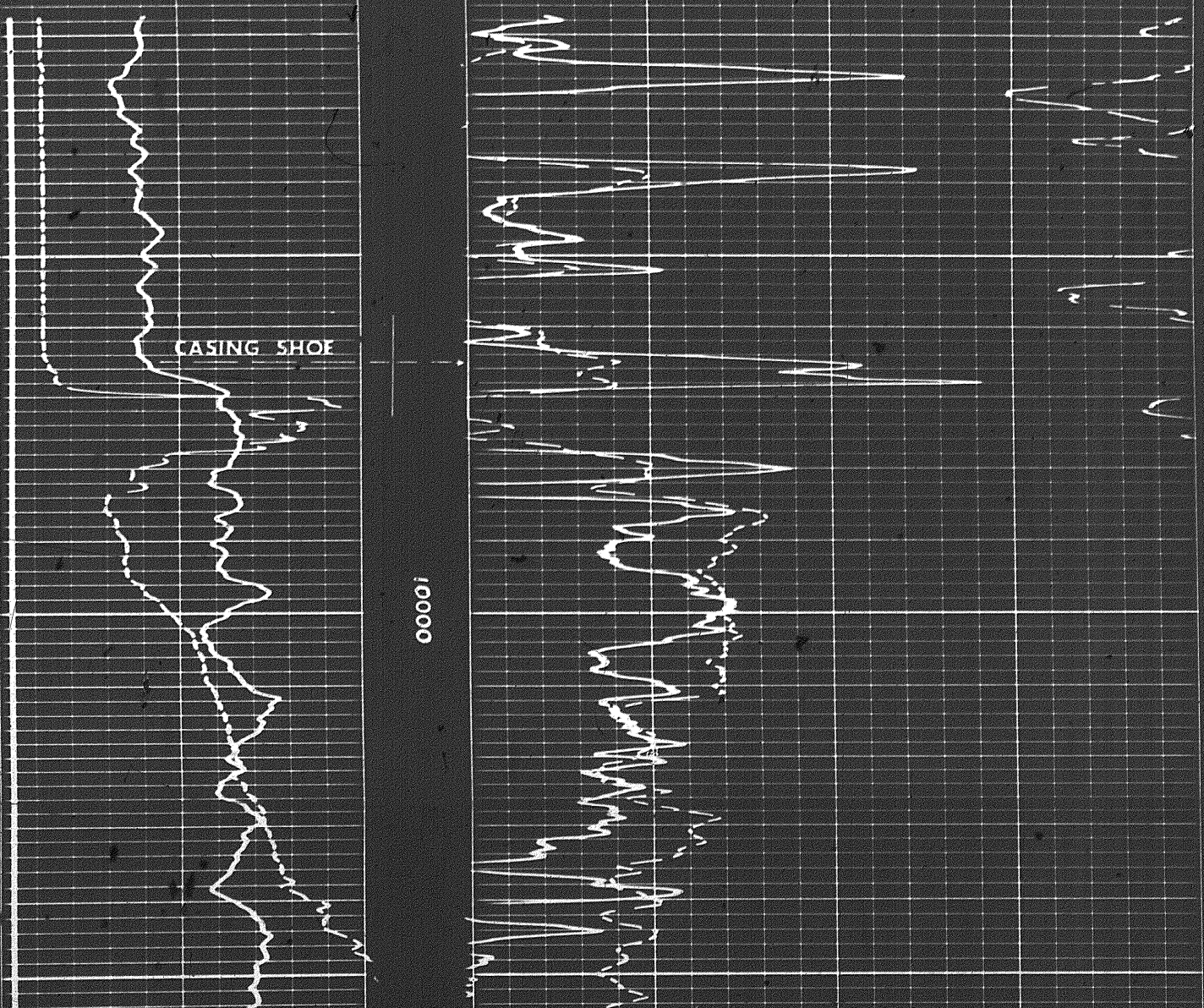
Scale in FPM

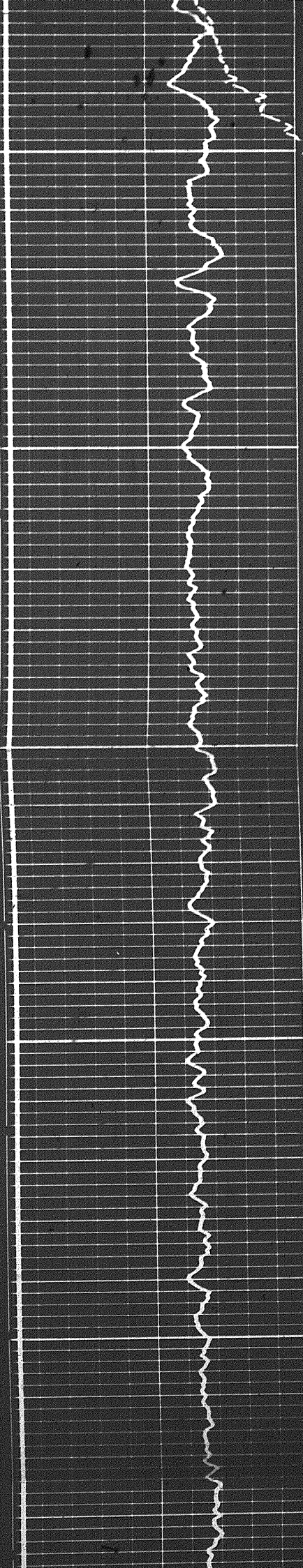
1000

0050

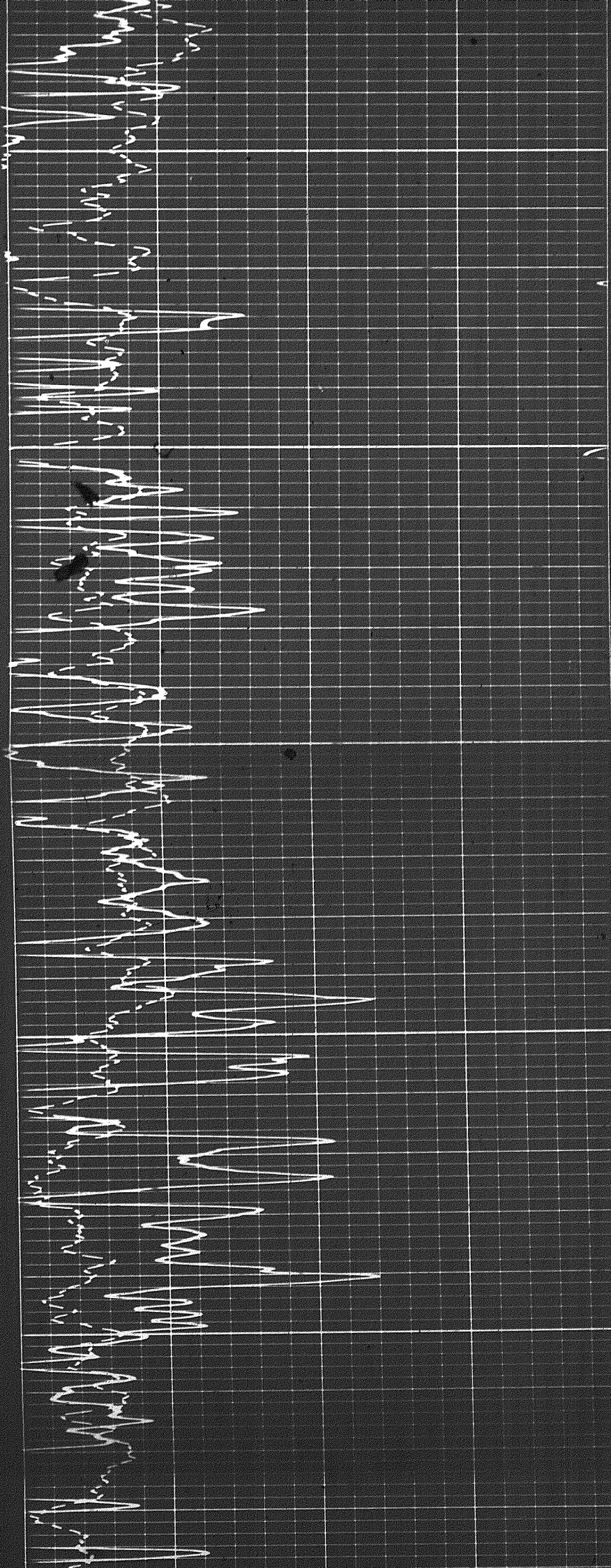
10000

CASING SHOE

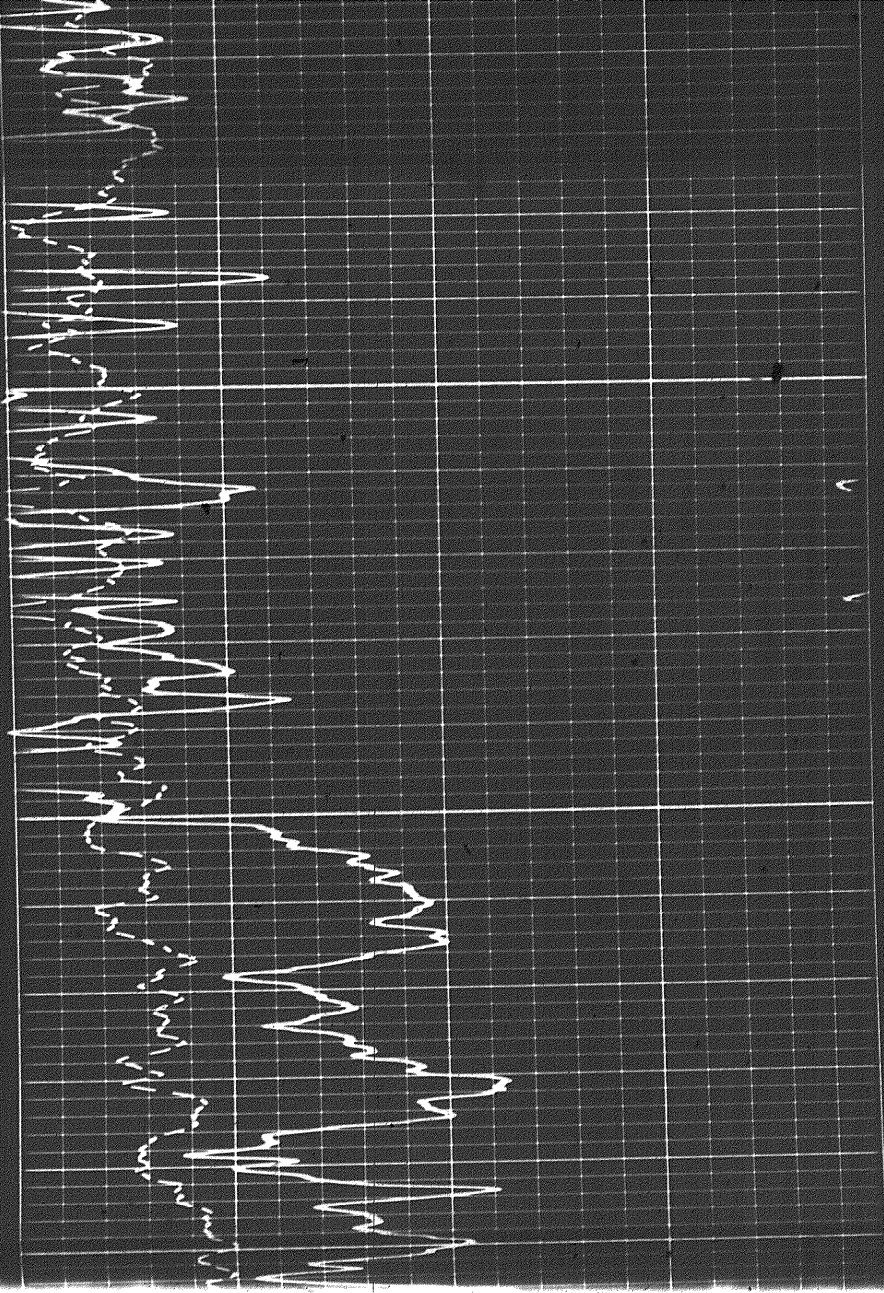




10100

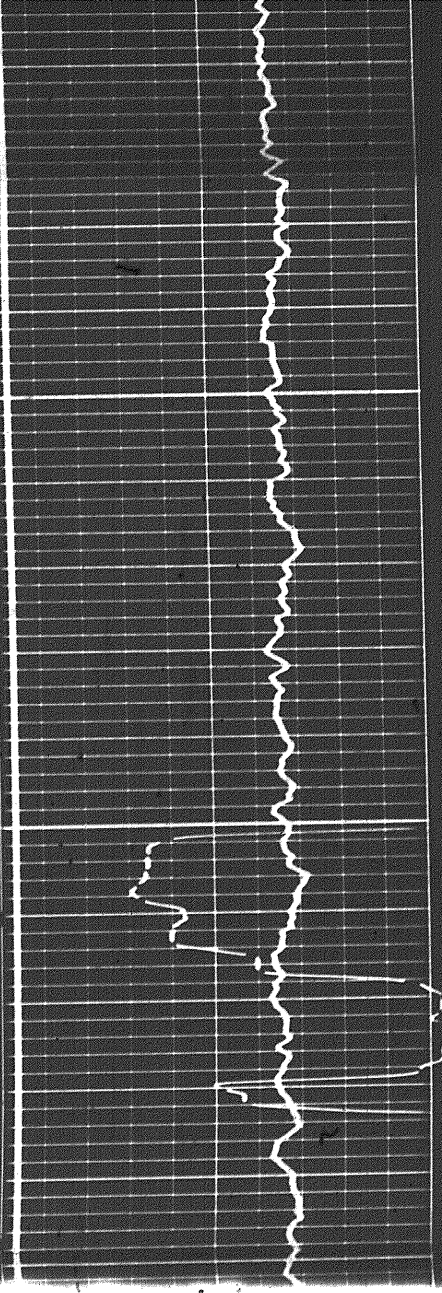


10200

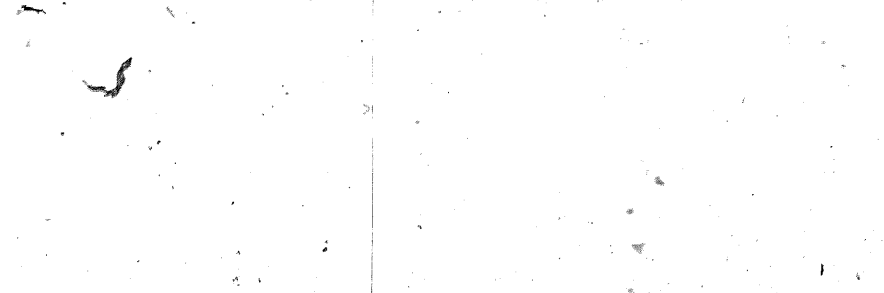
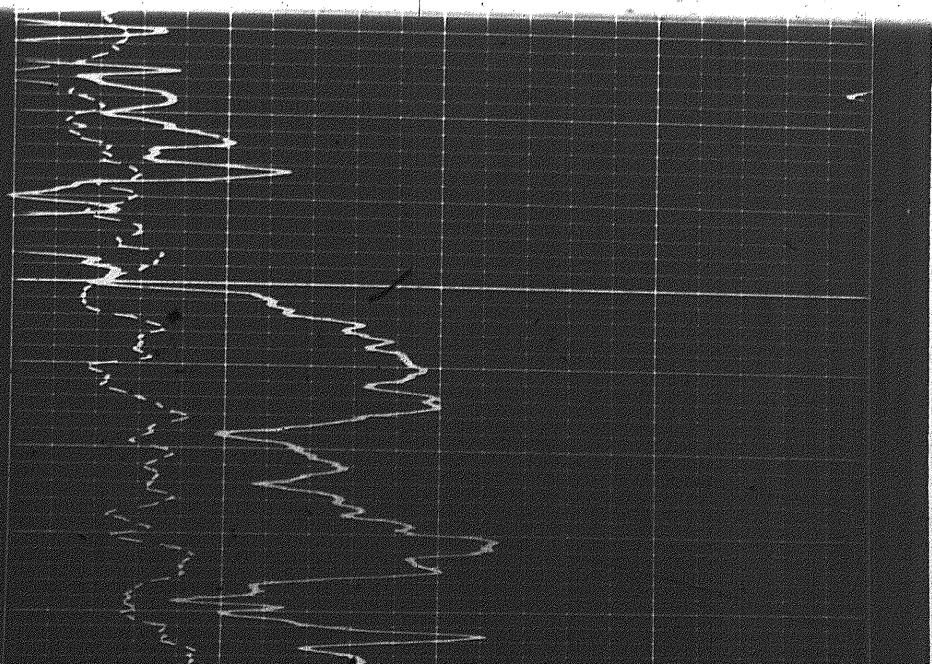


10300

10400



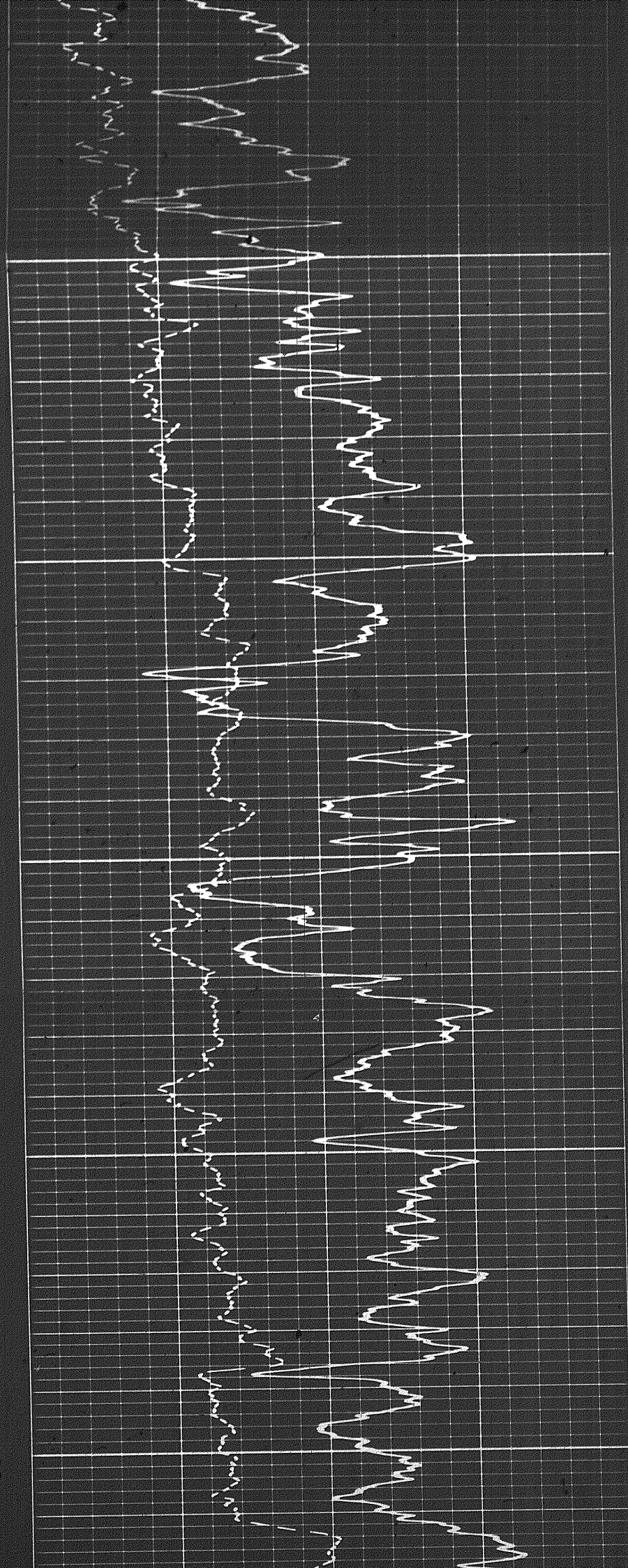
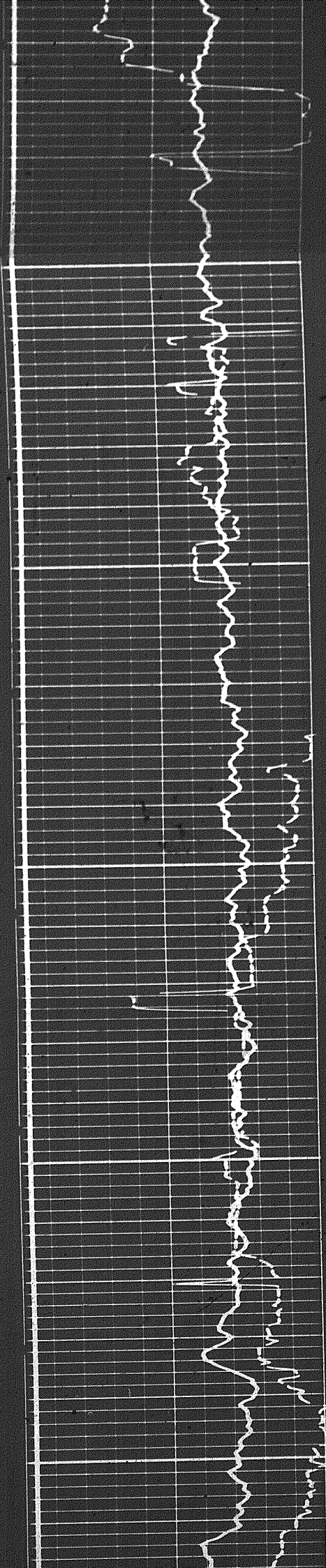
10400



10400

10500

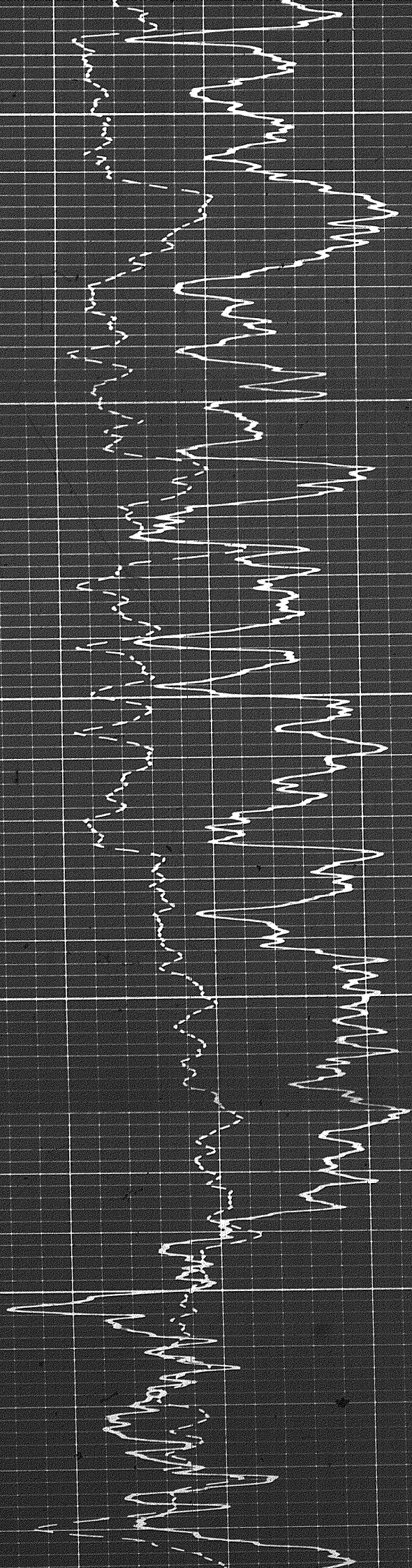
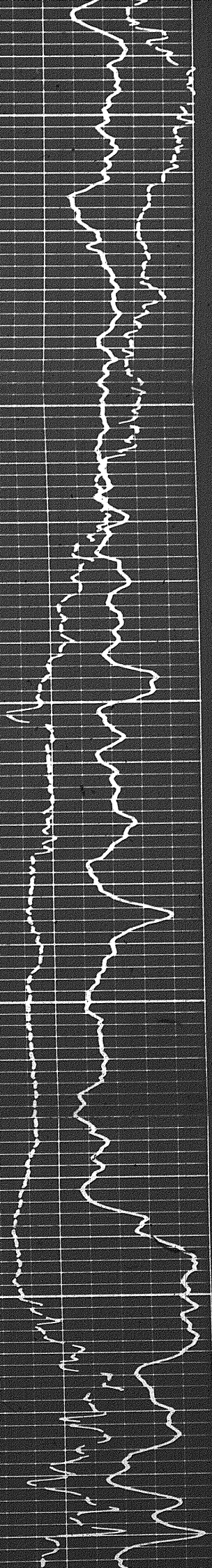
10600

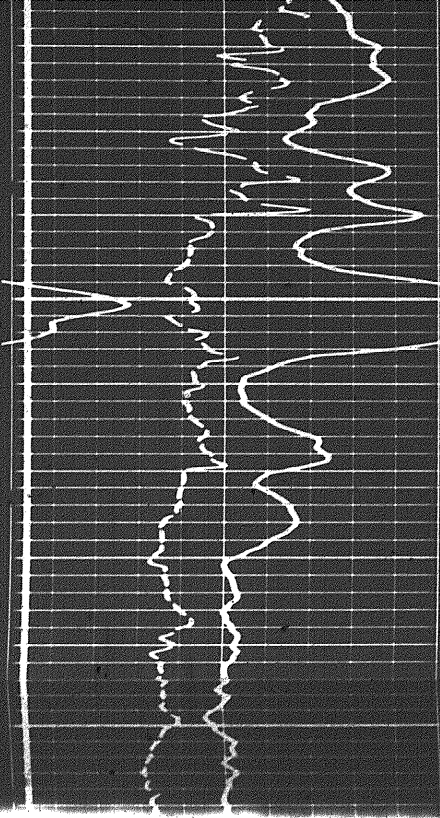


10600

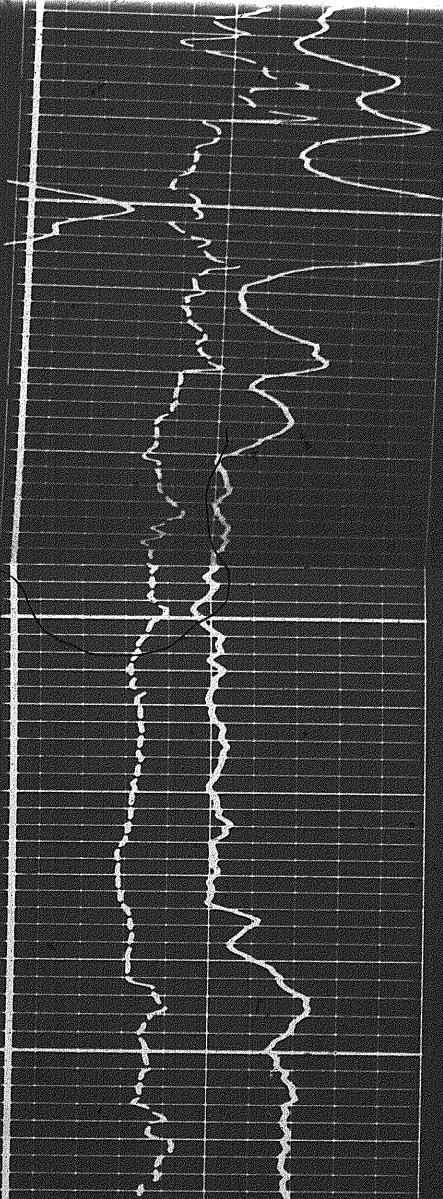
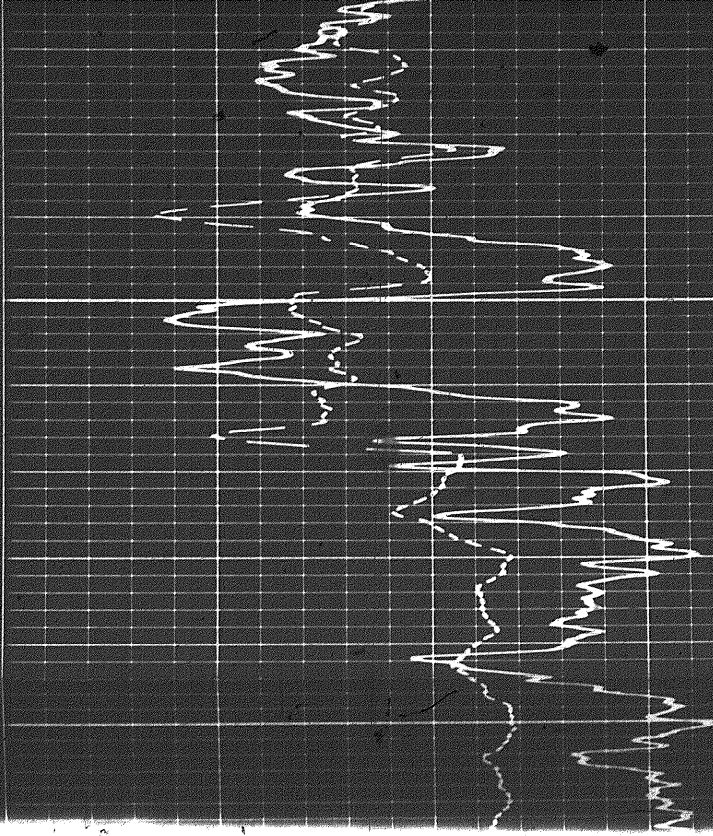
10700

10800

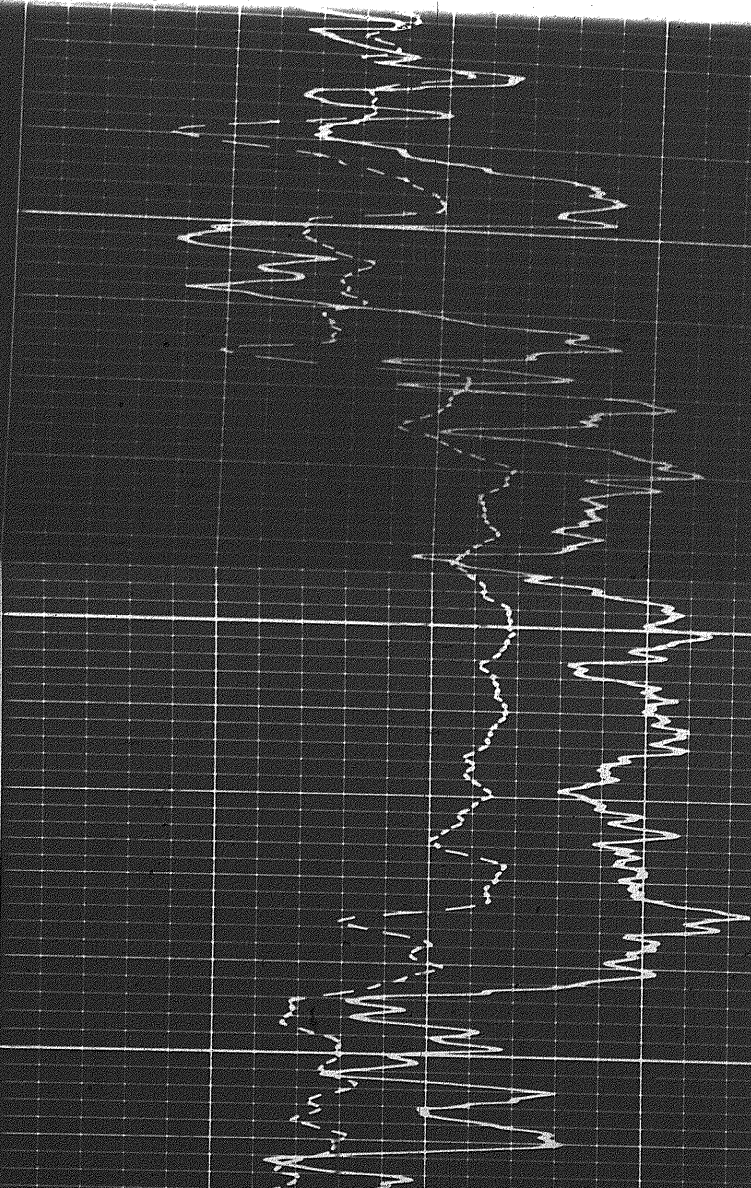




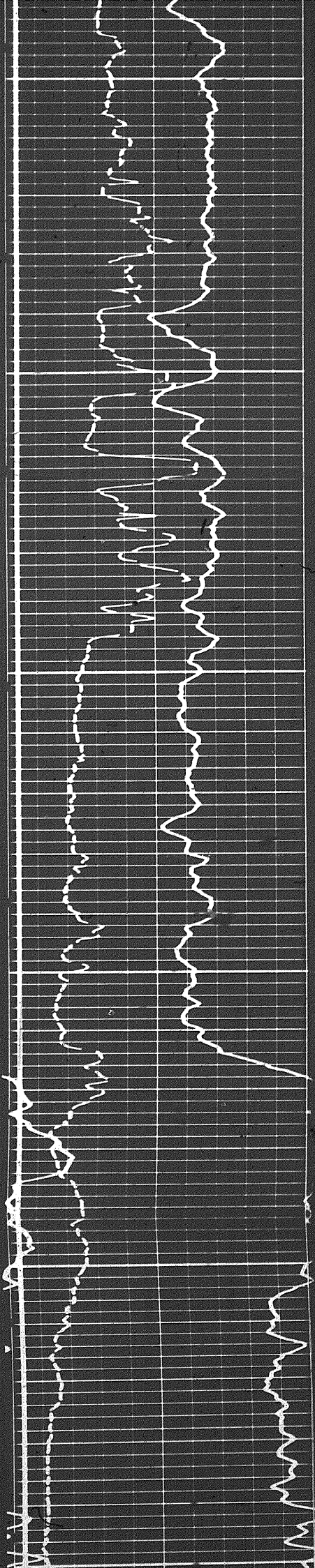
10900



00601



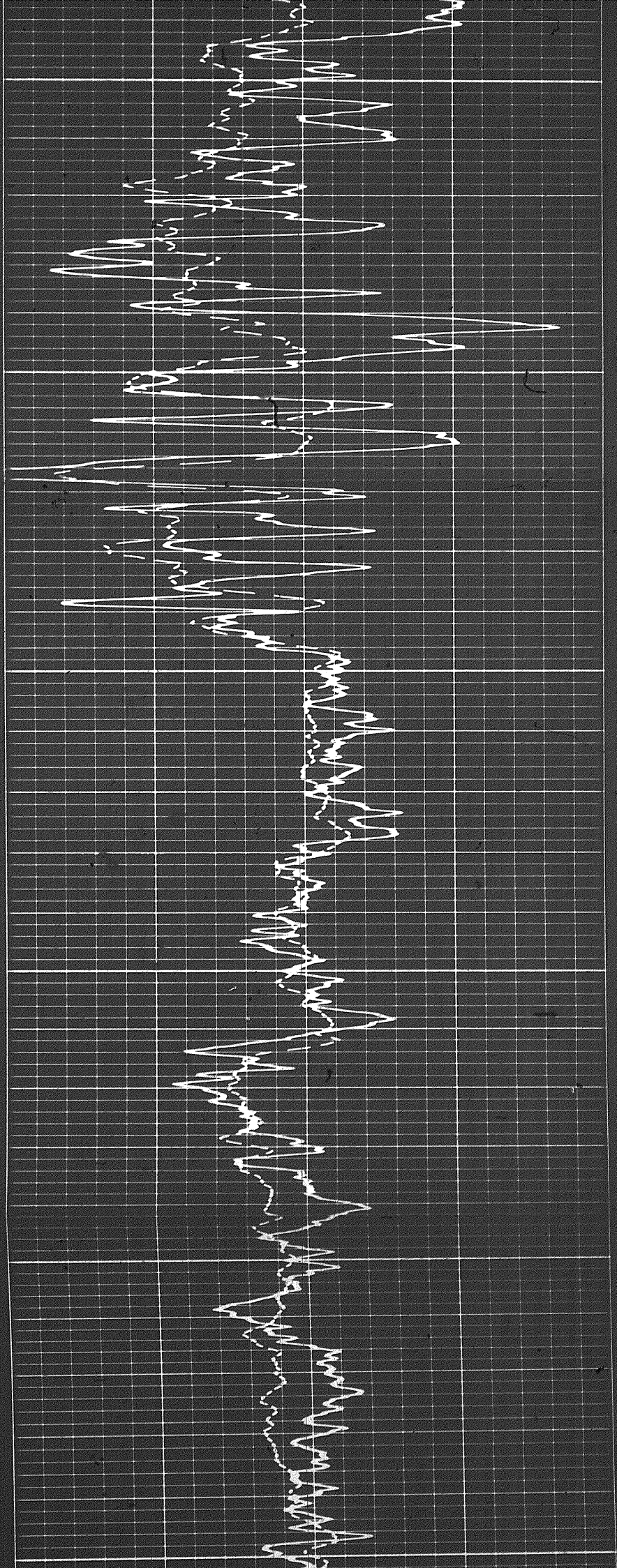


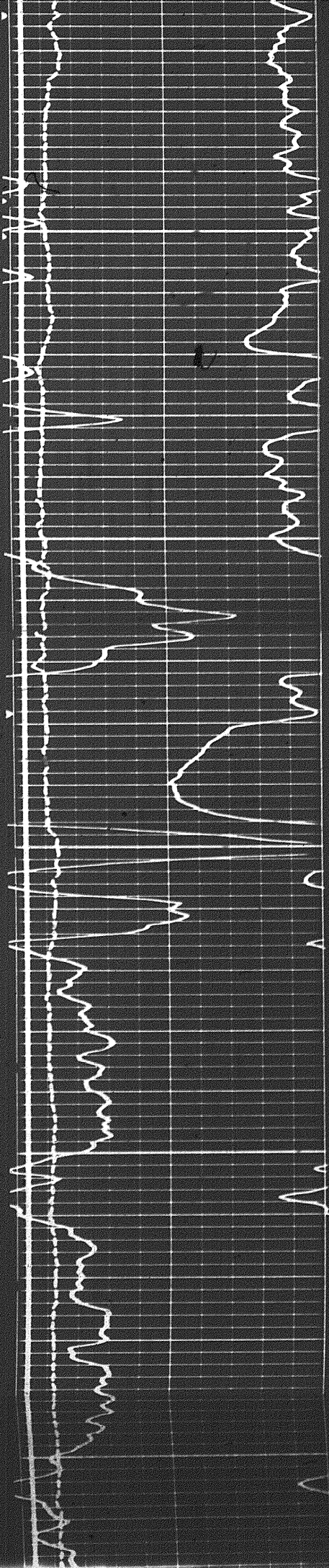


11000

11100

11200

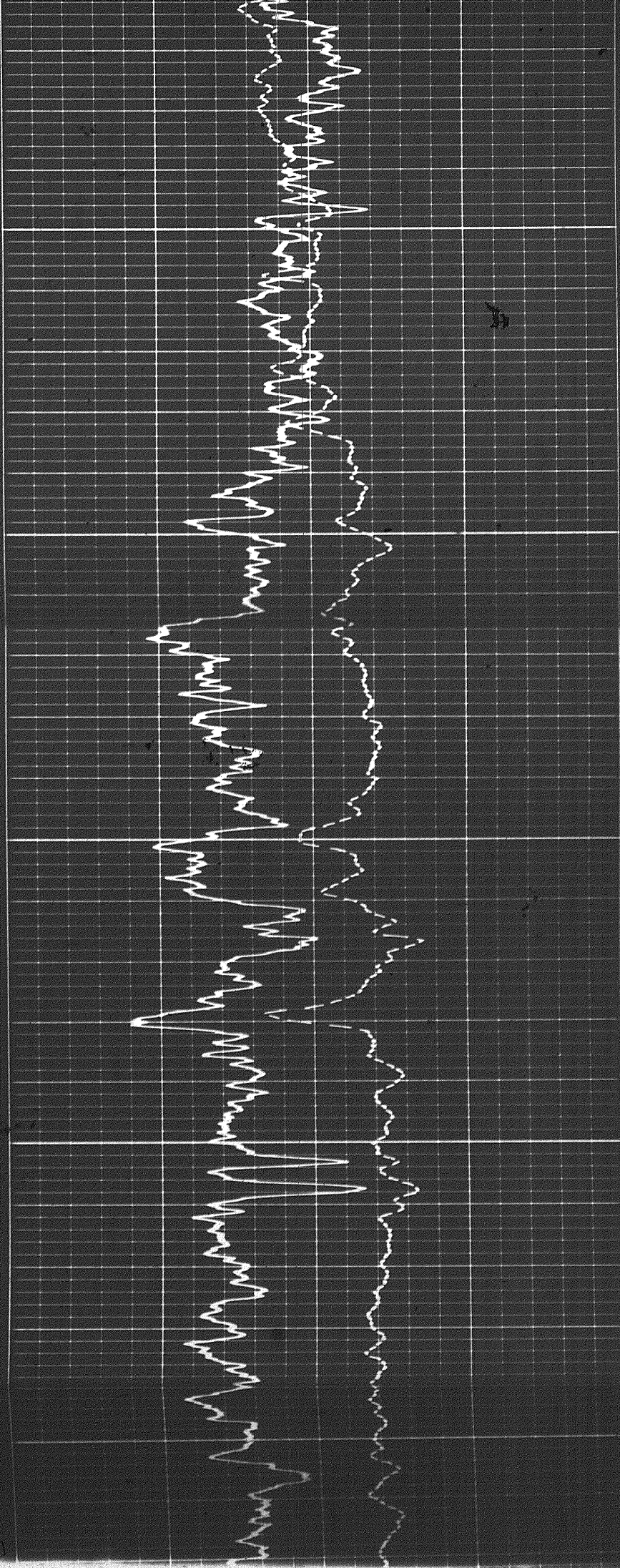


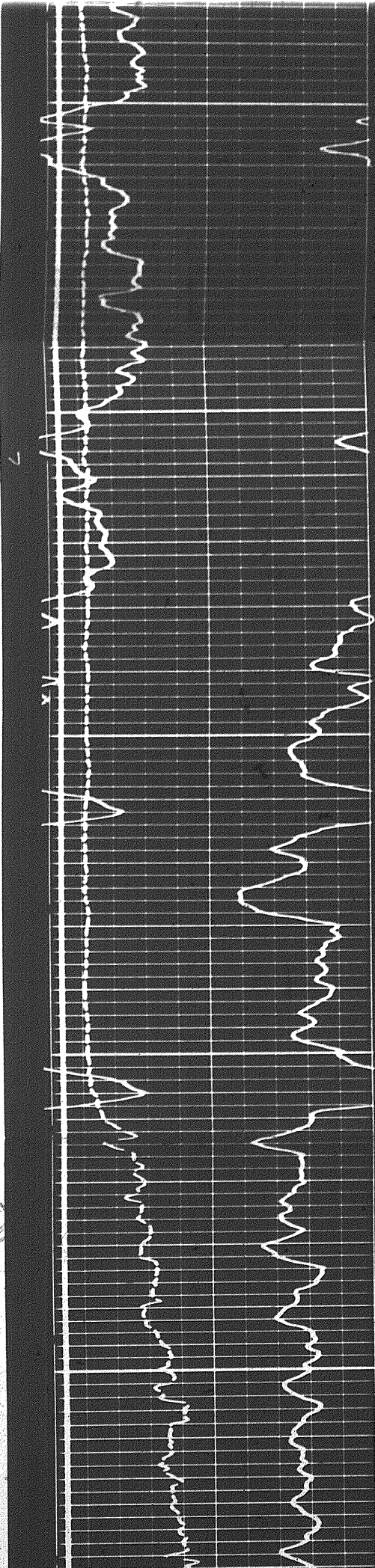


1200

1300

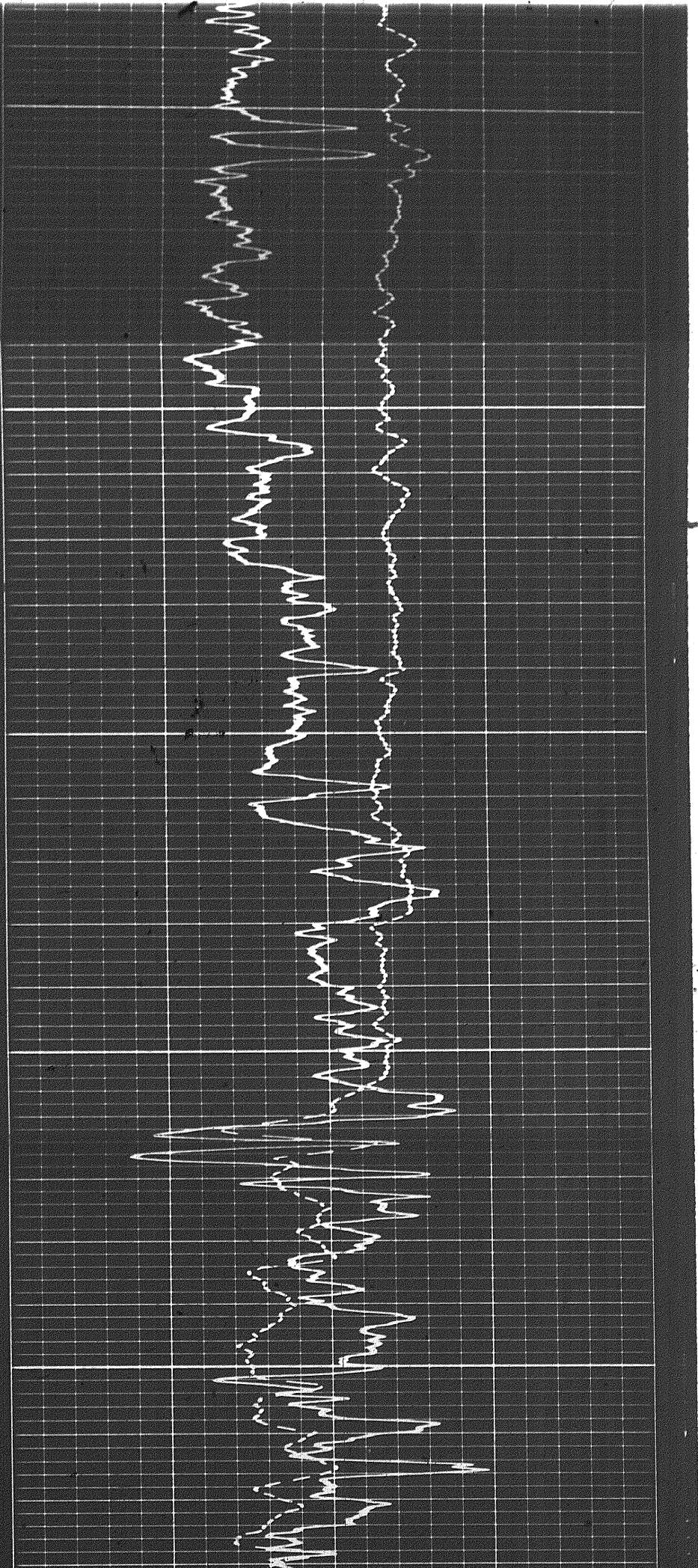
1400

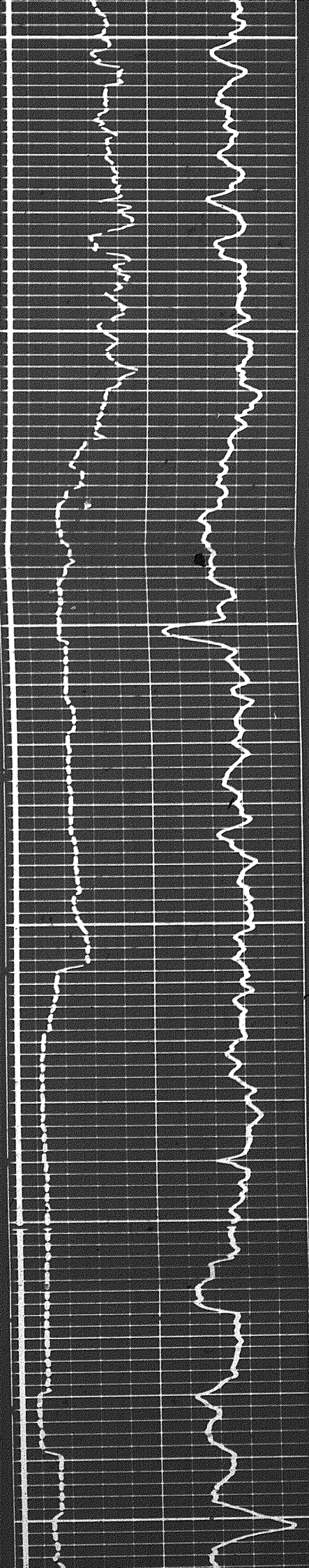




11400

11500

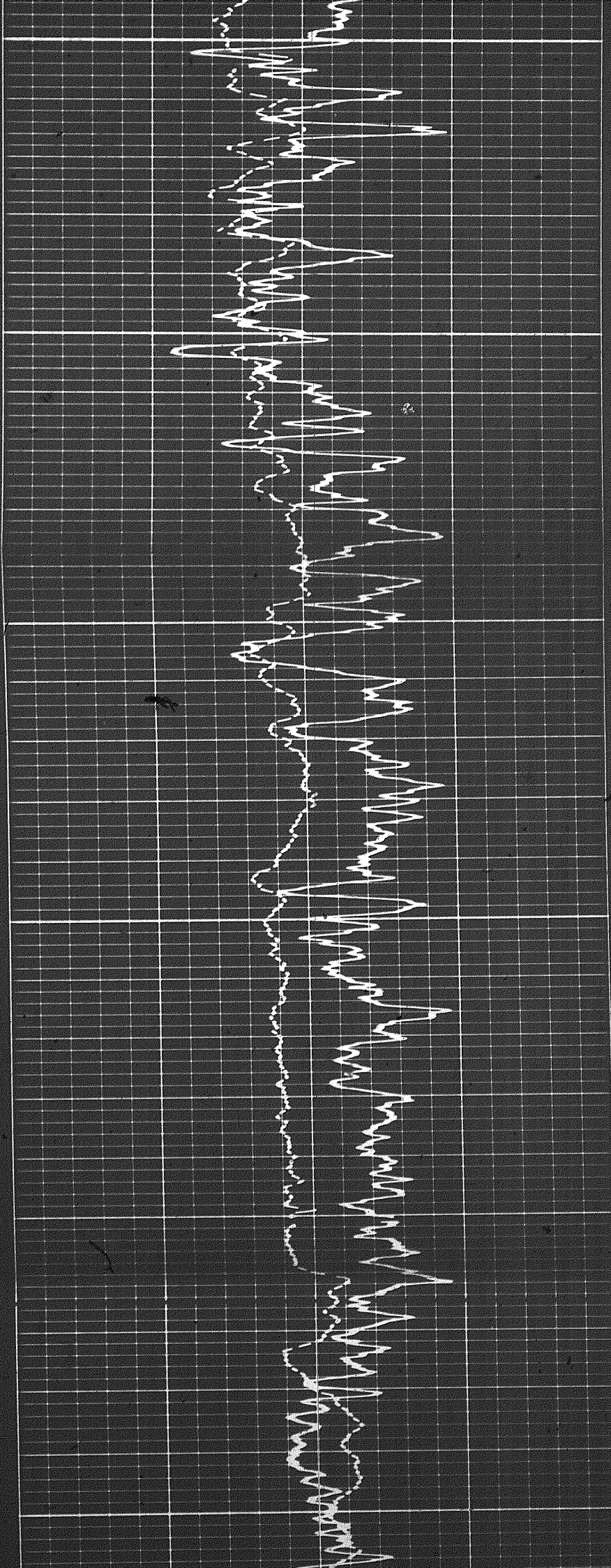




11600

11700

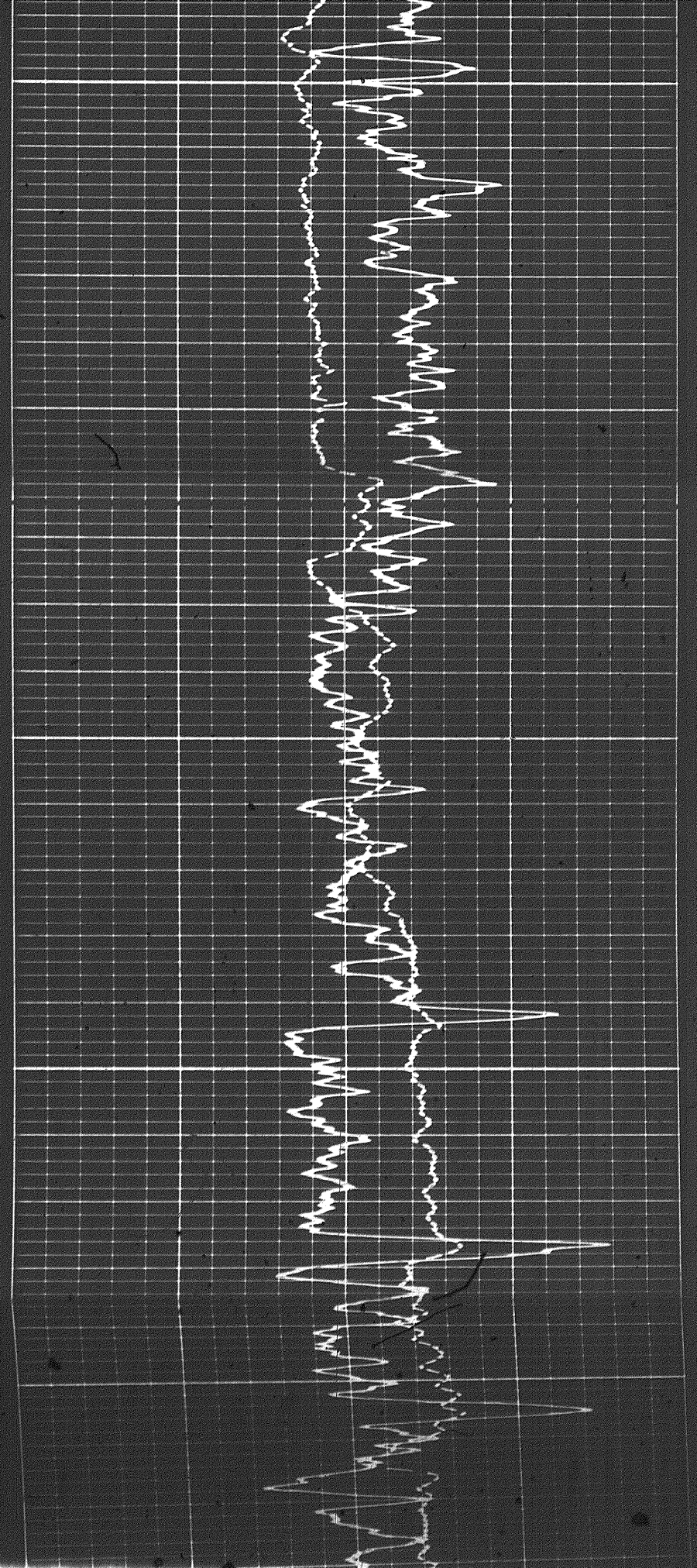
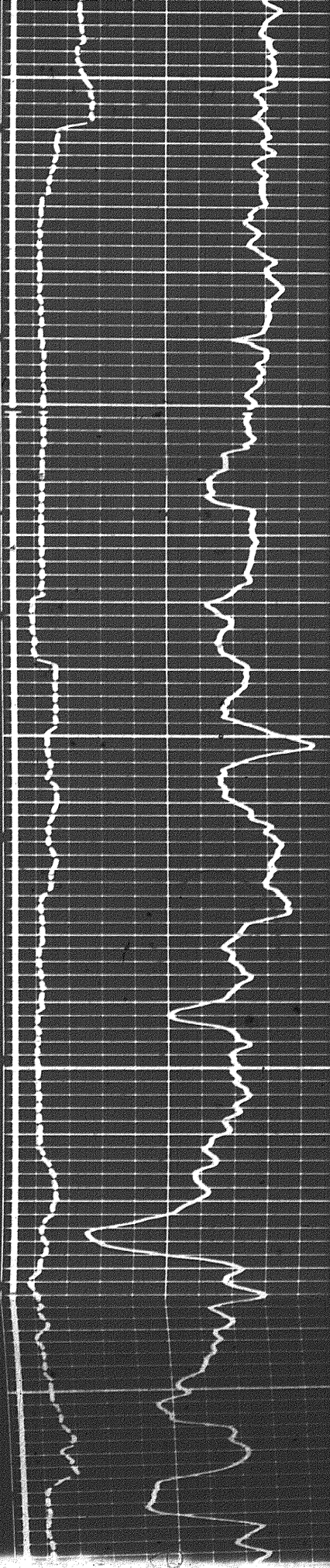
11800

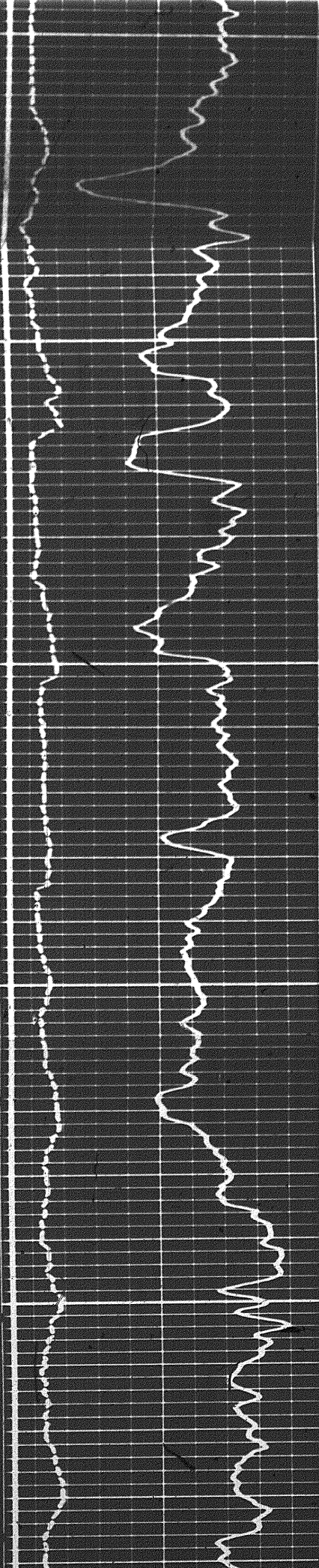


11700

11800

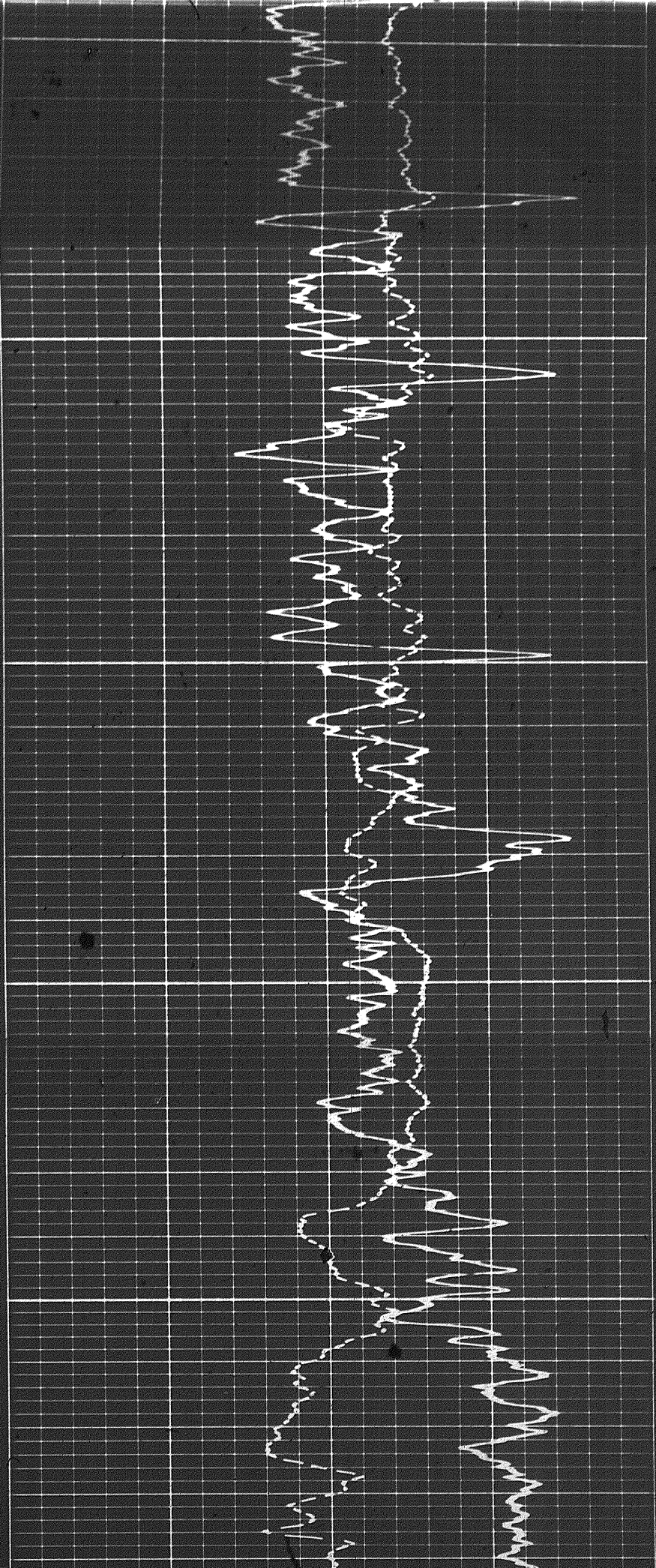
11900

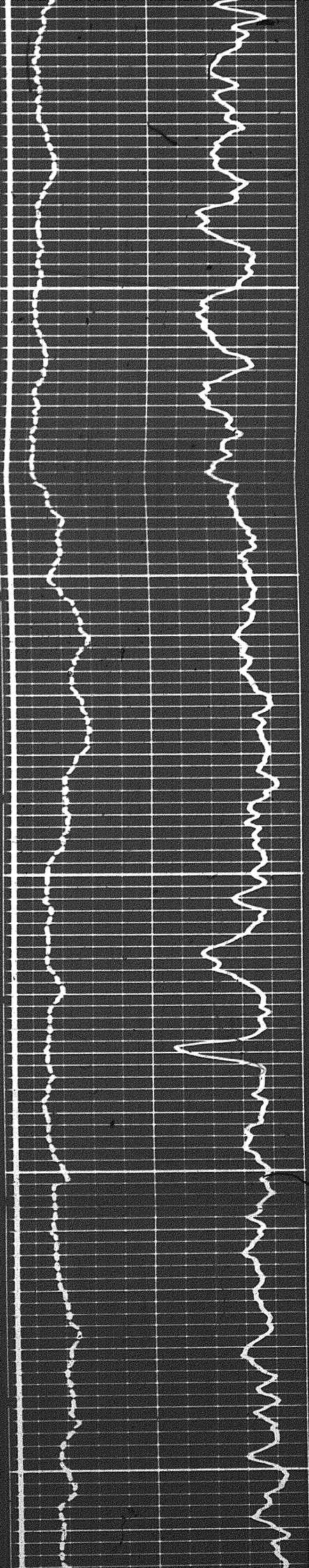




11900

12000

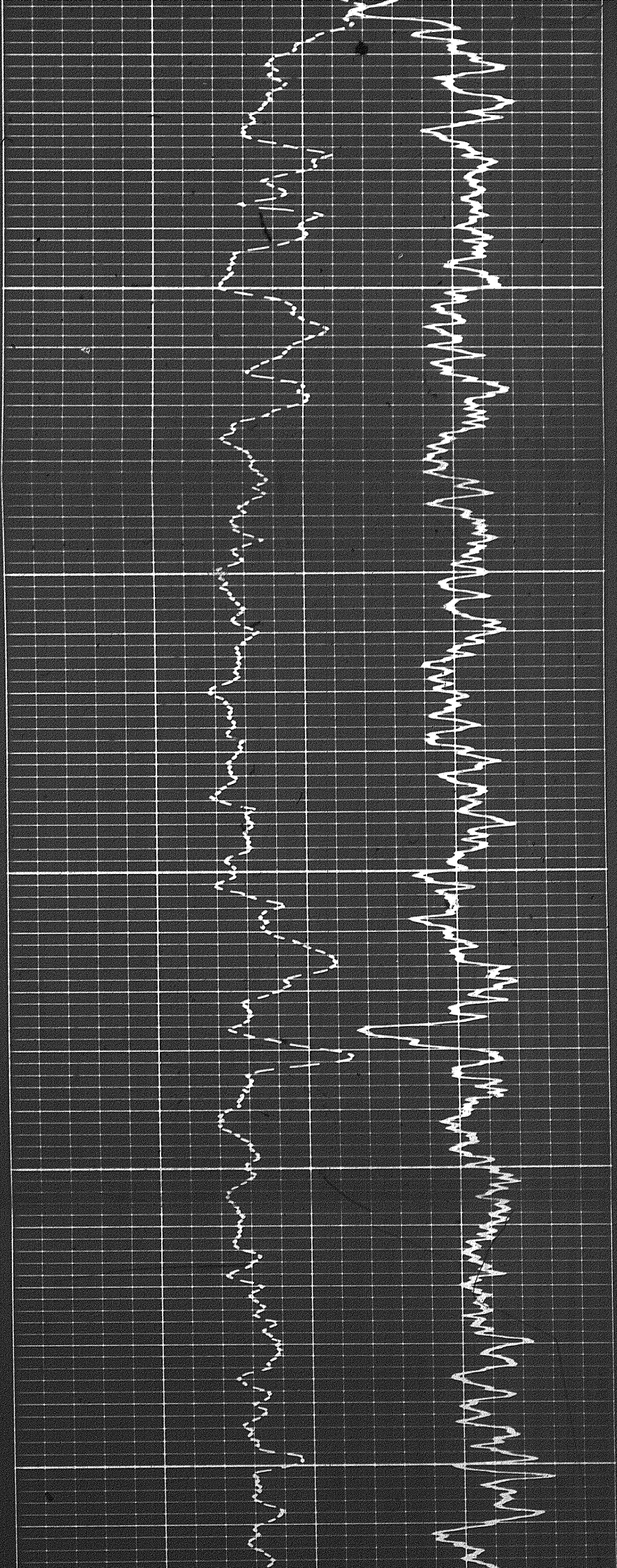


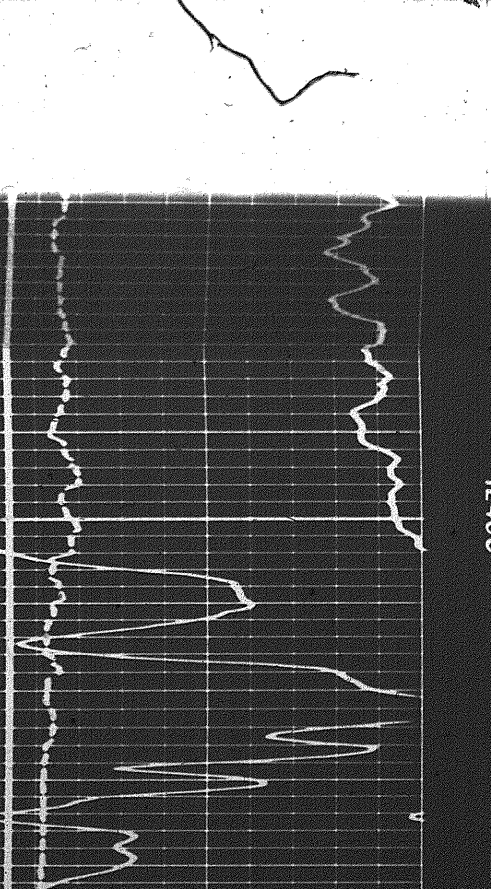
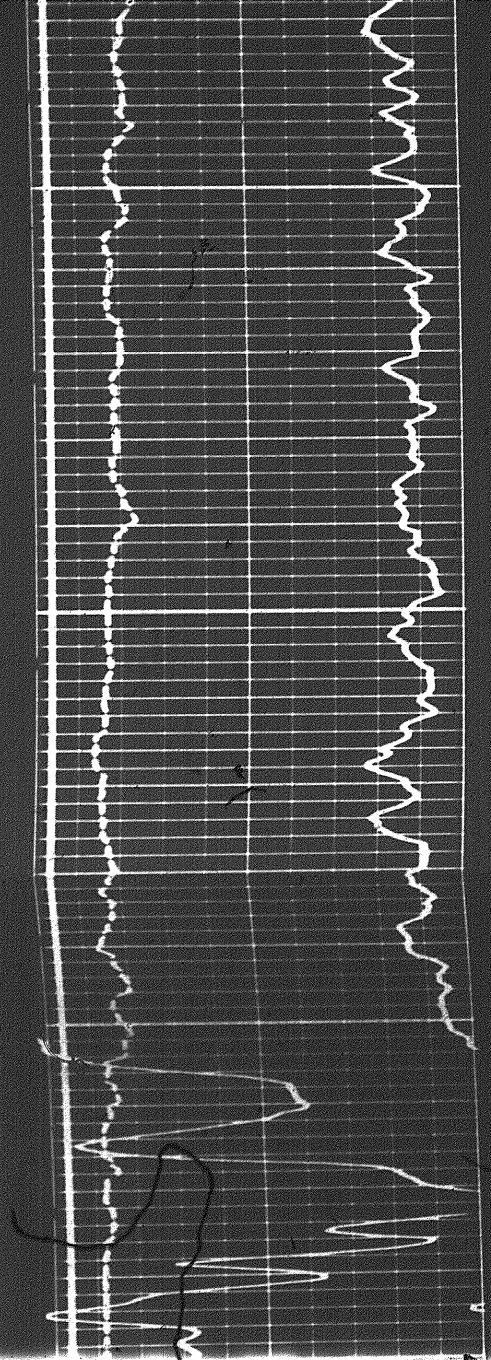
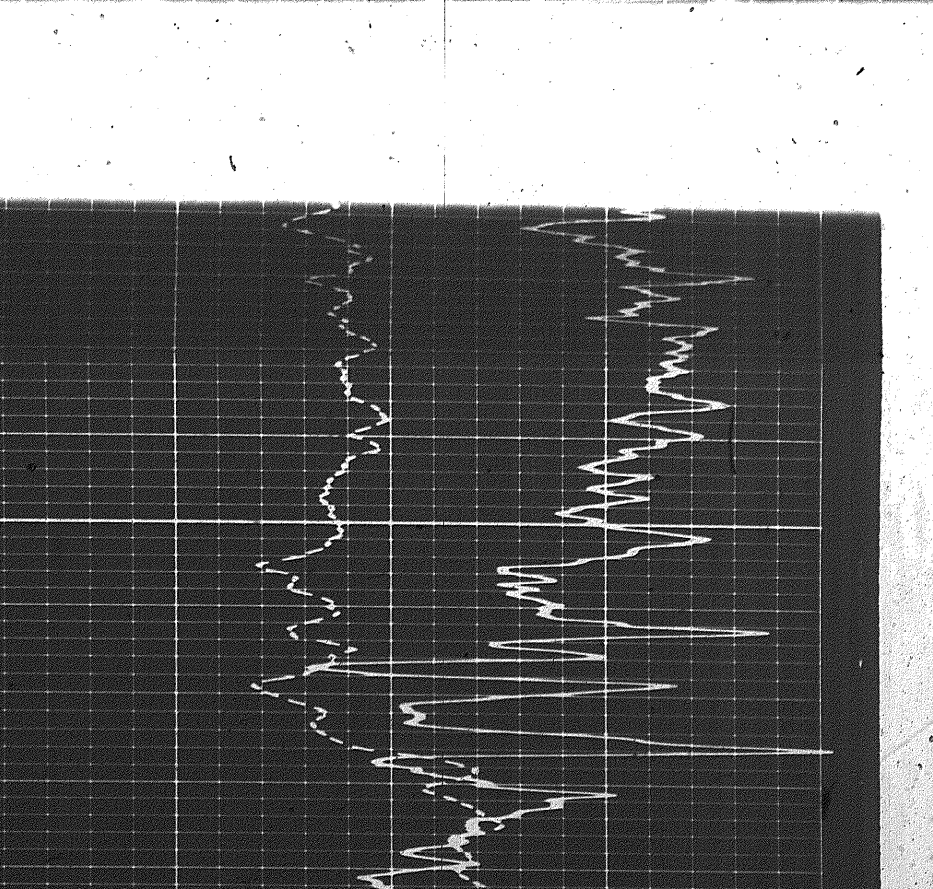
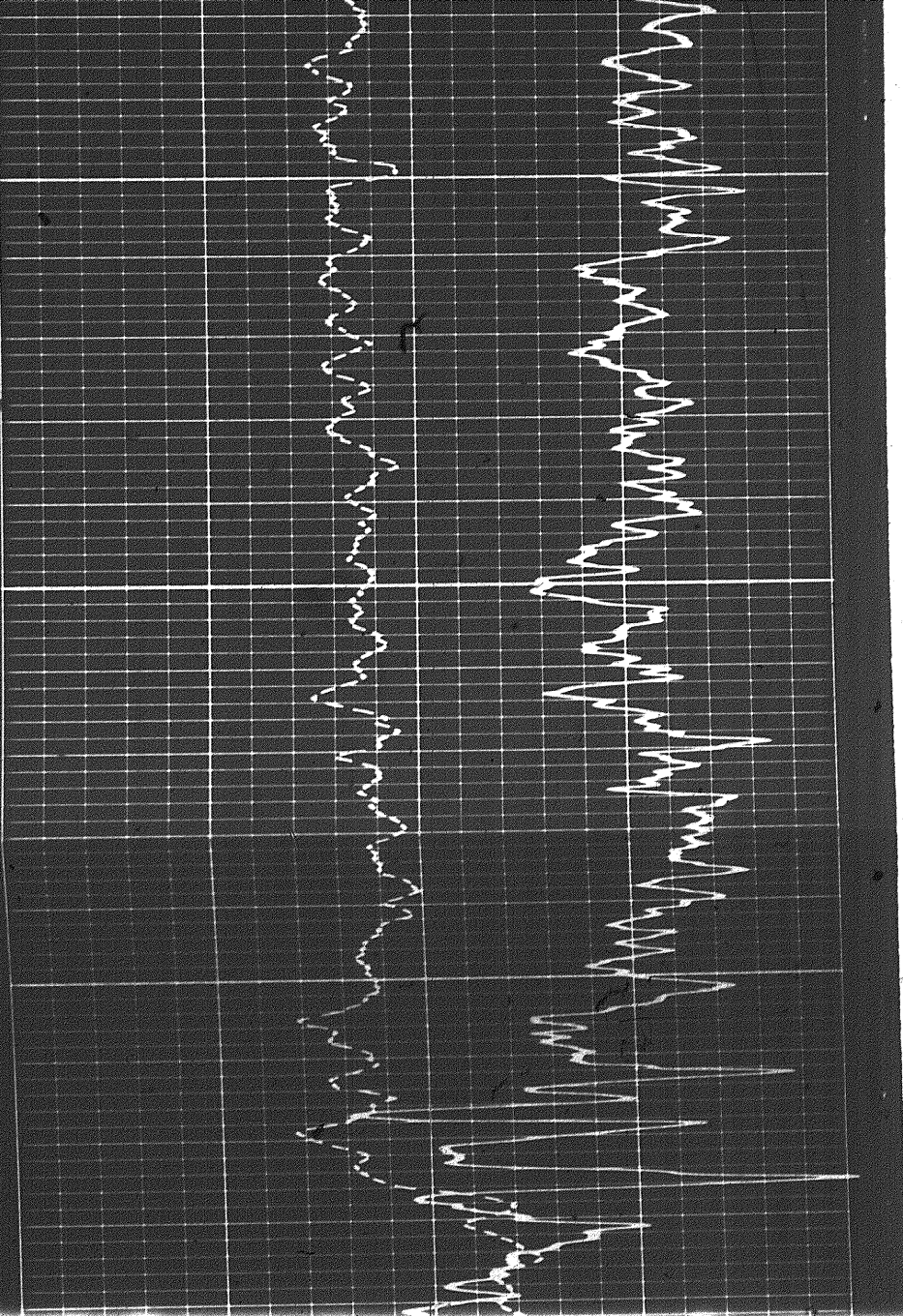


12:00

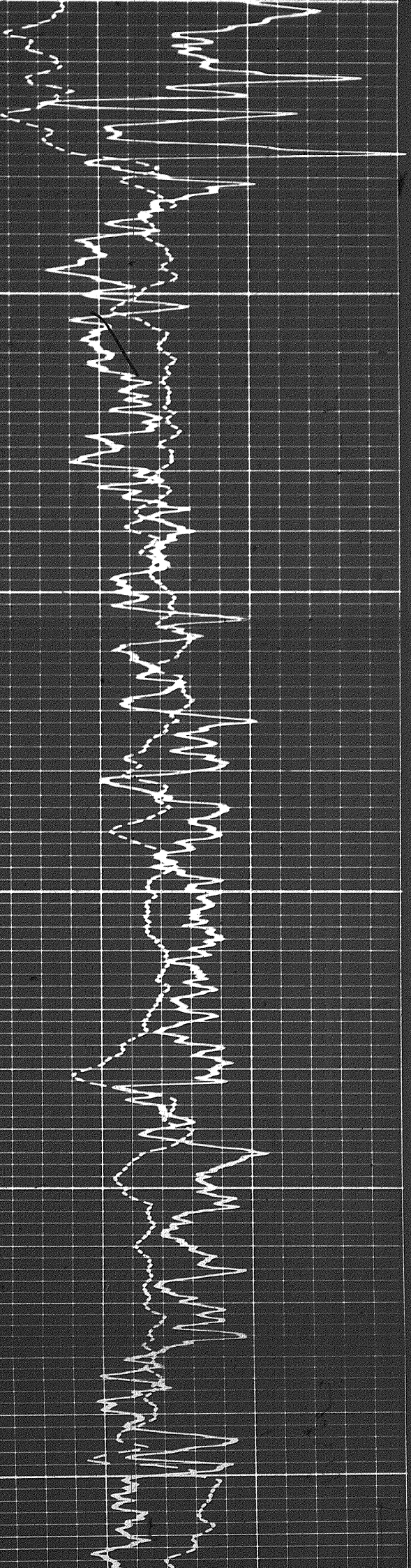
12:20

12:30





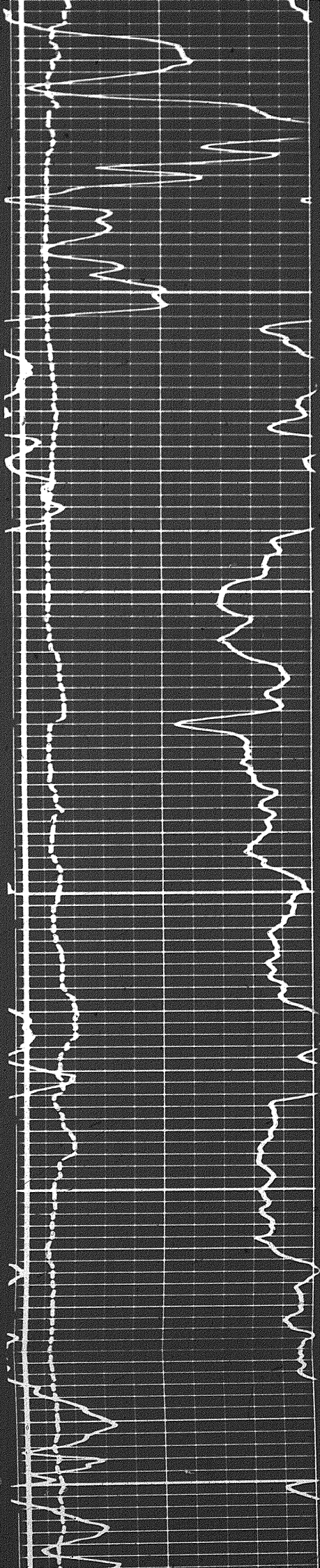


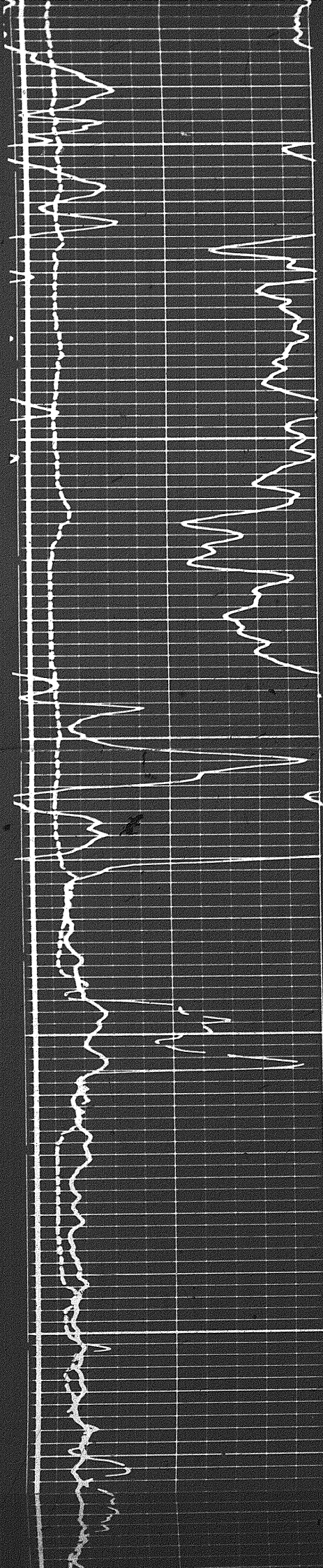


00

12500

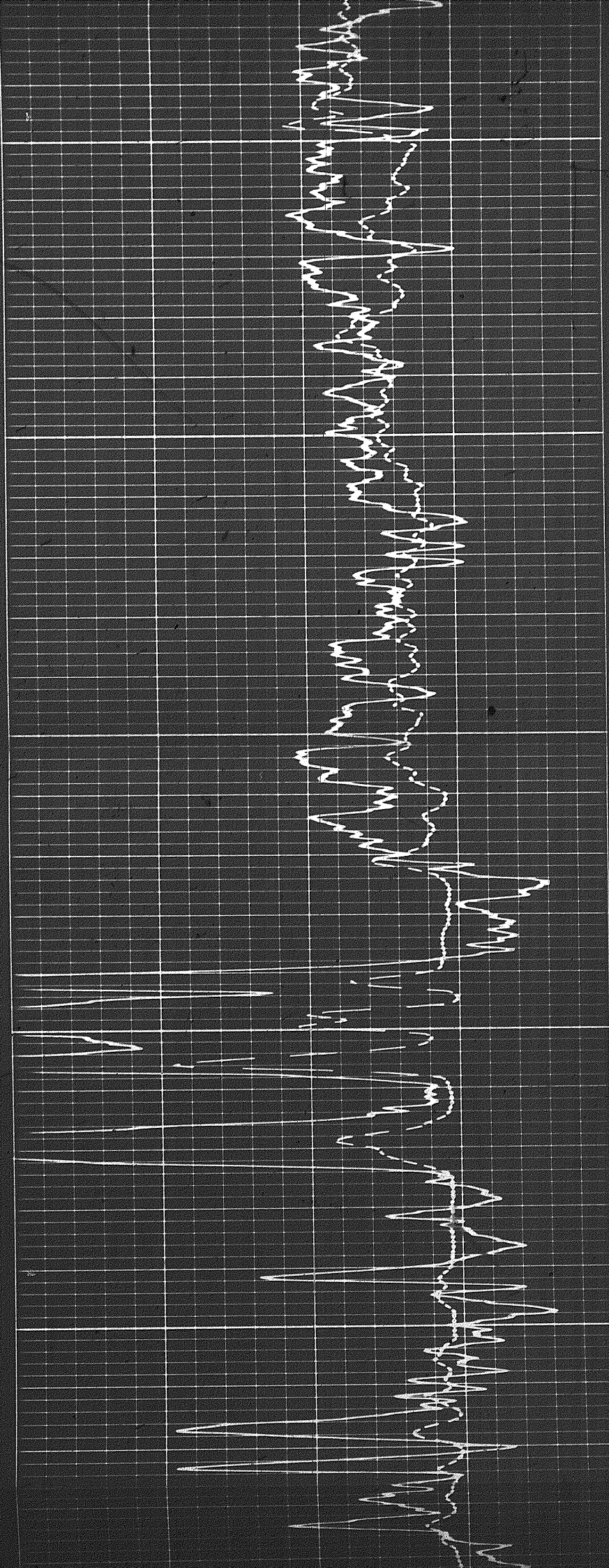
12600

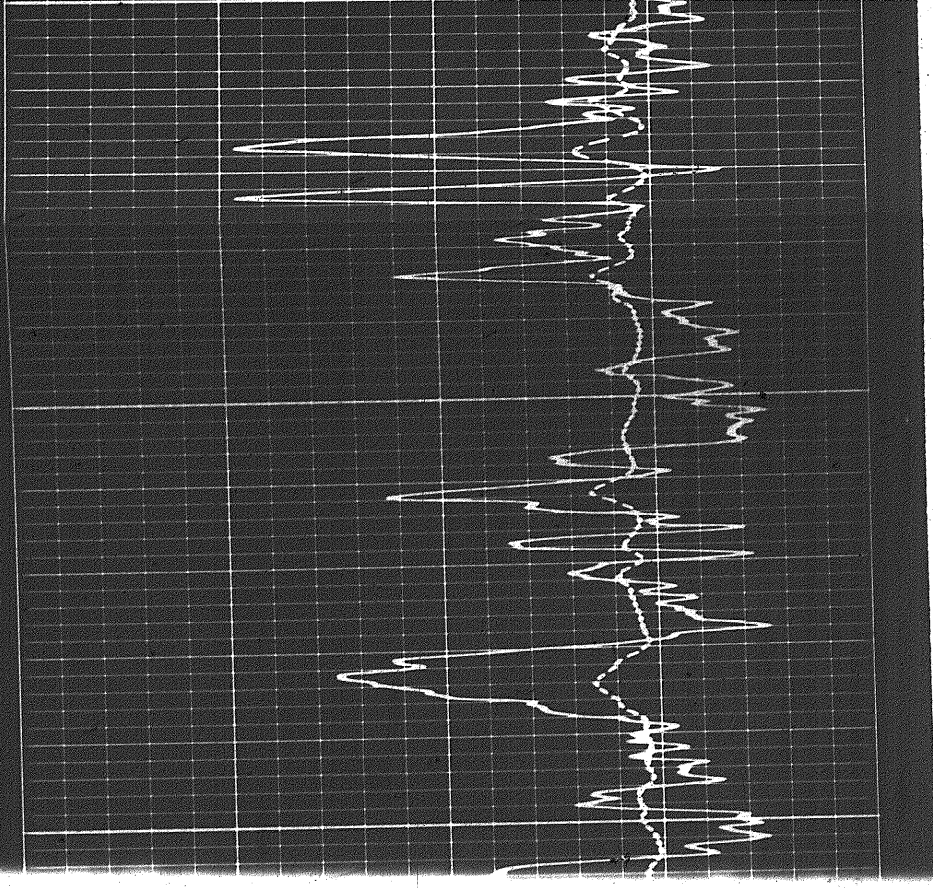




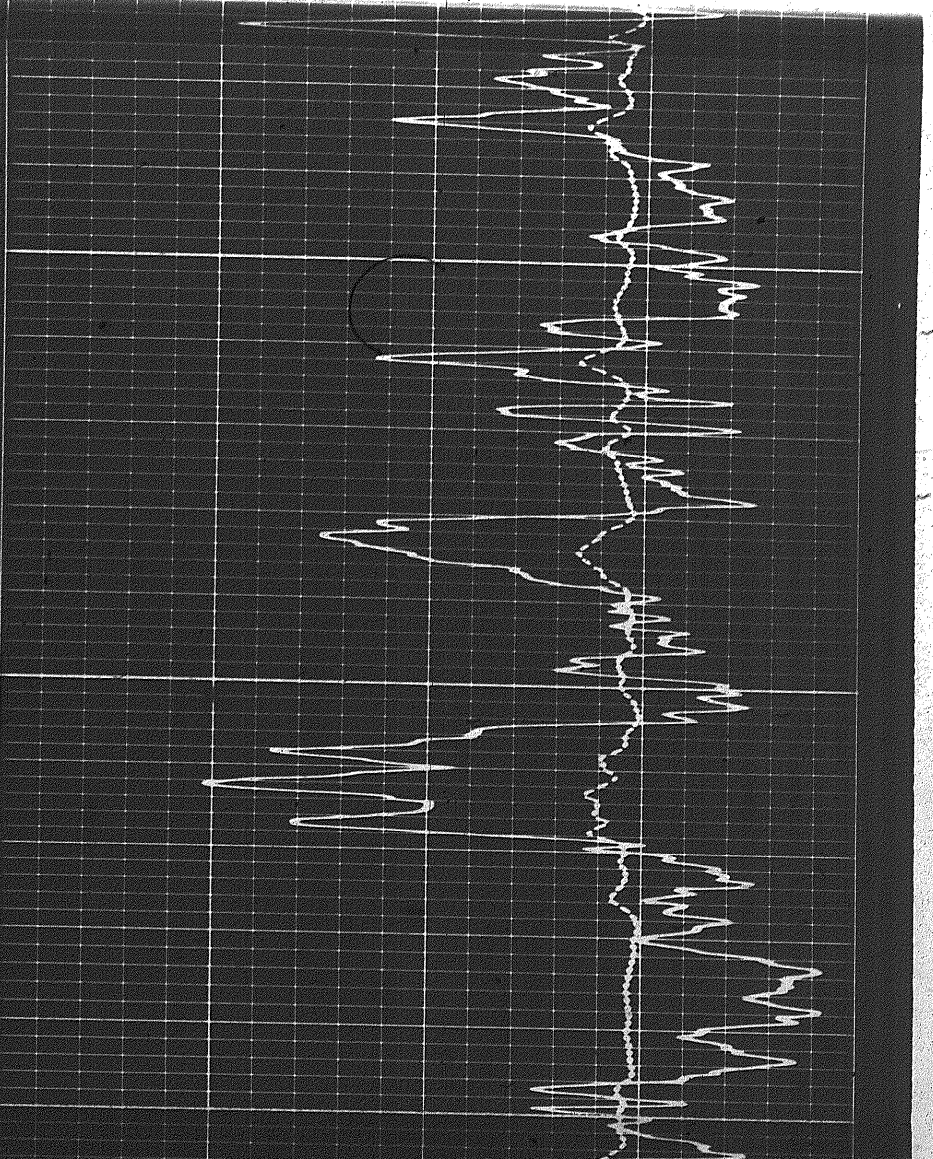
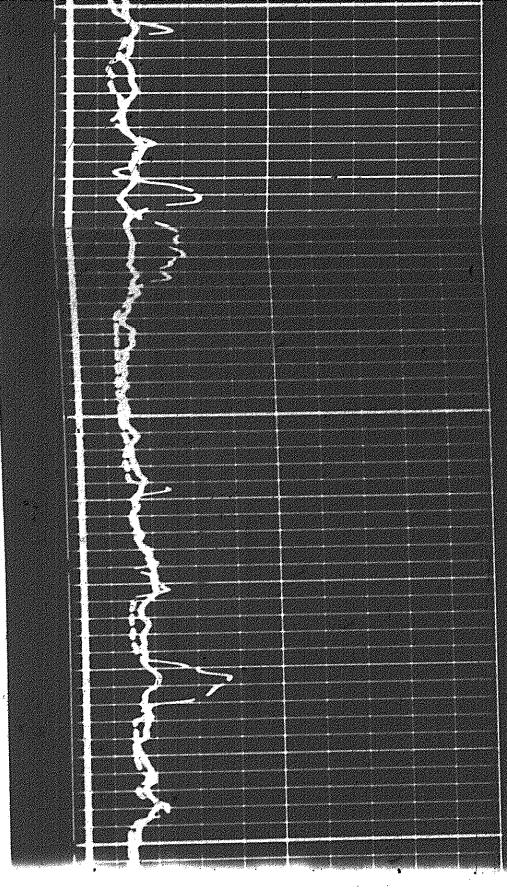
12700

12800



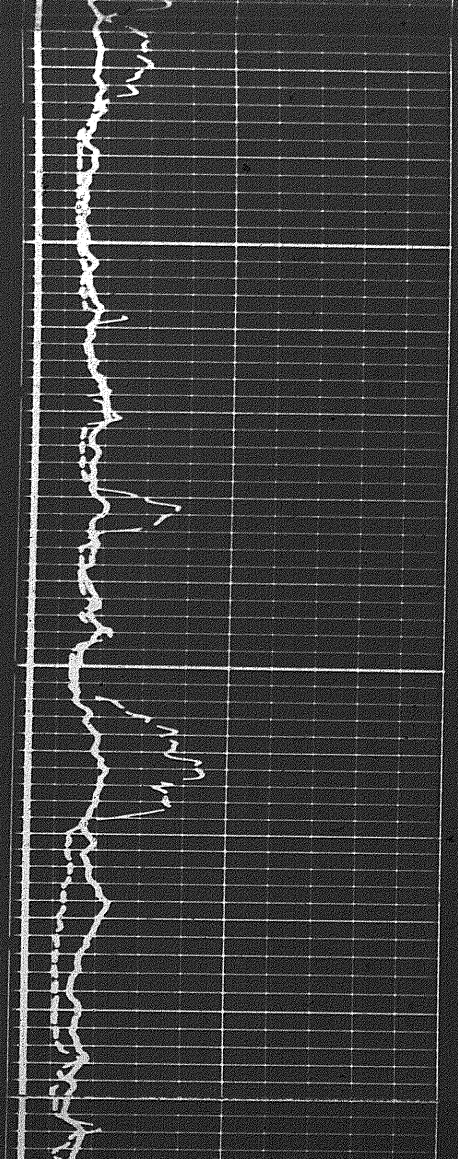


12900

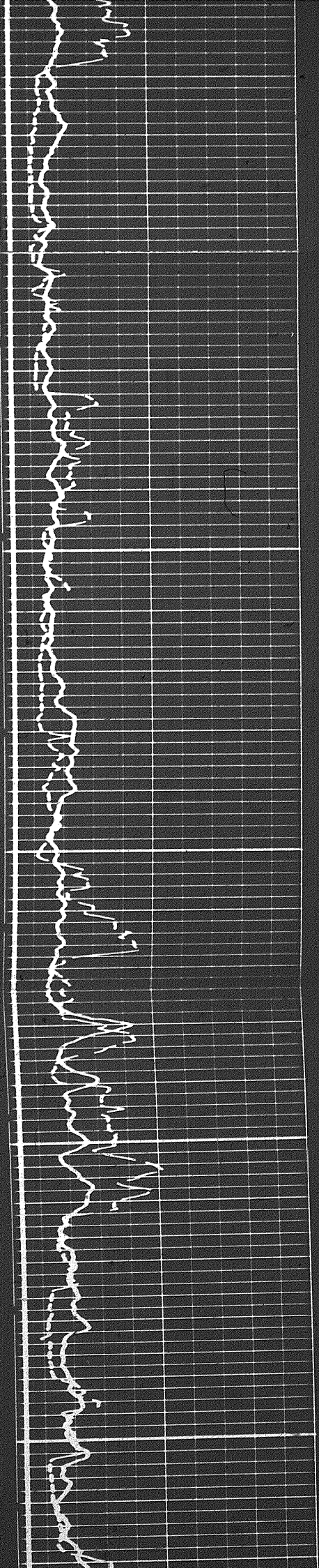


12900

12900



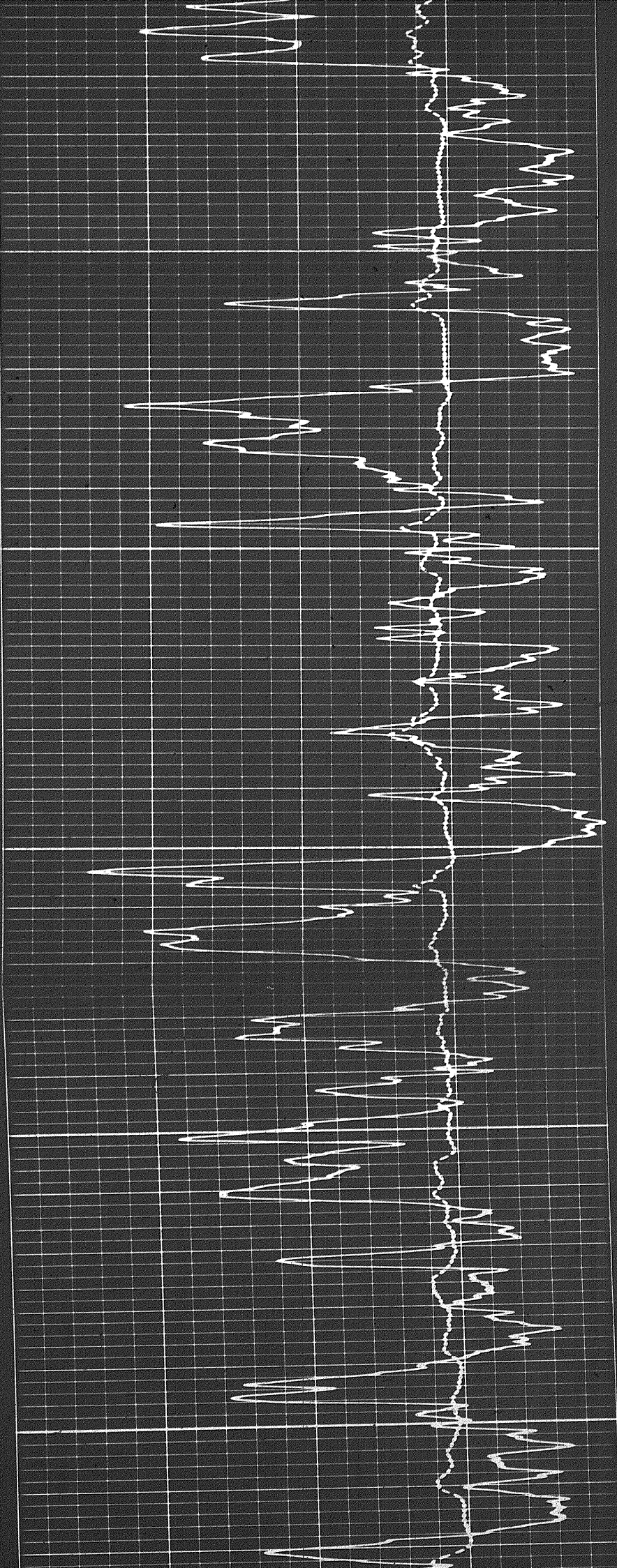
13000

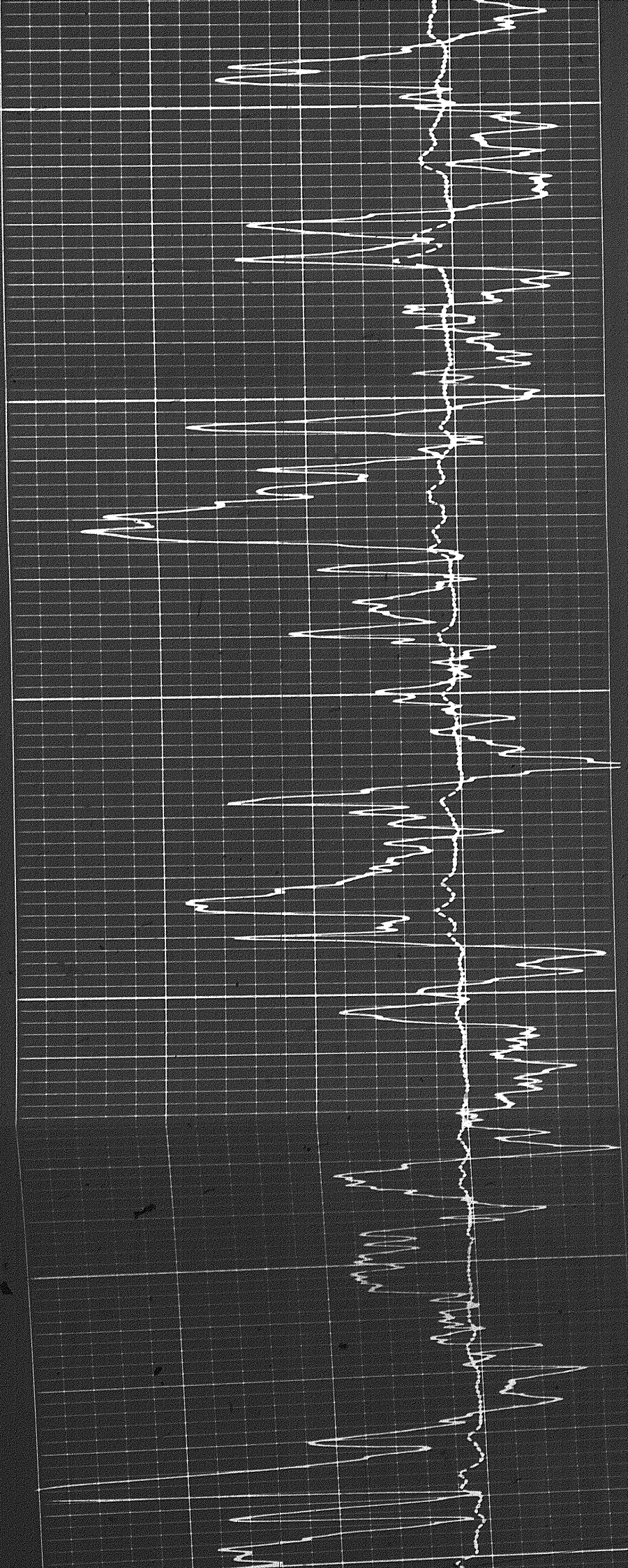


13000

13100

13200

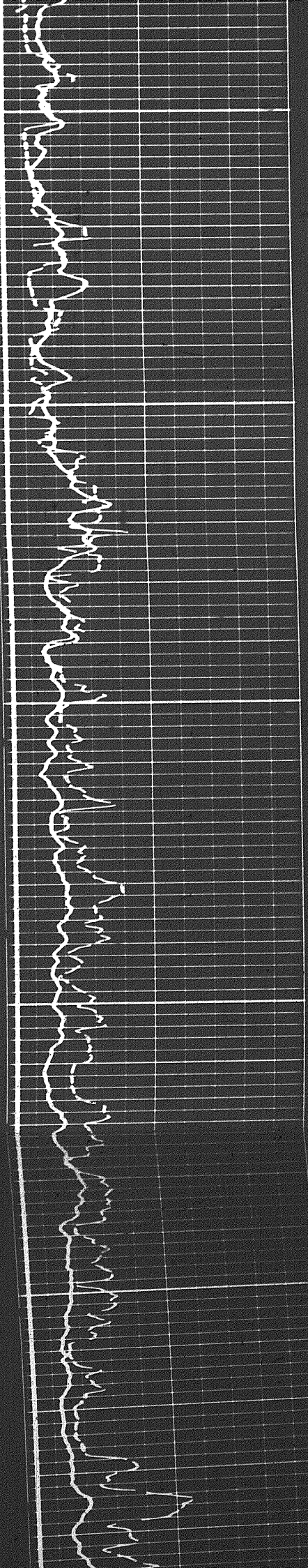


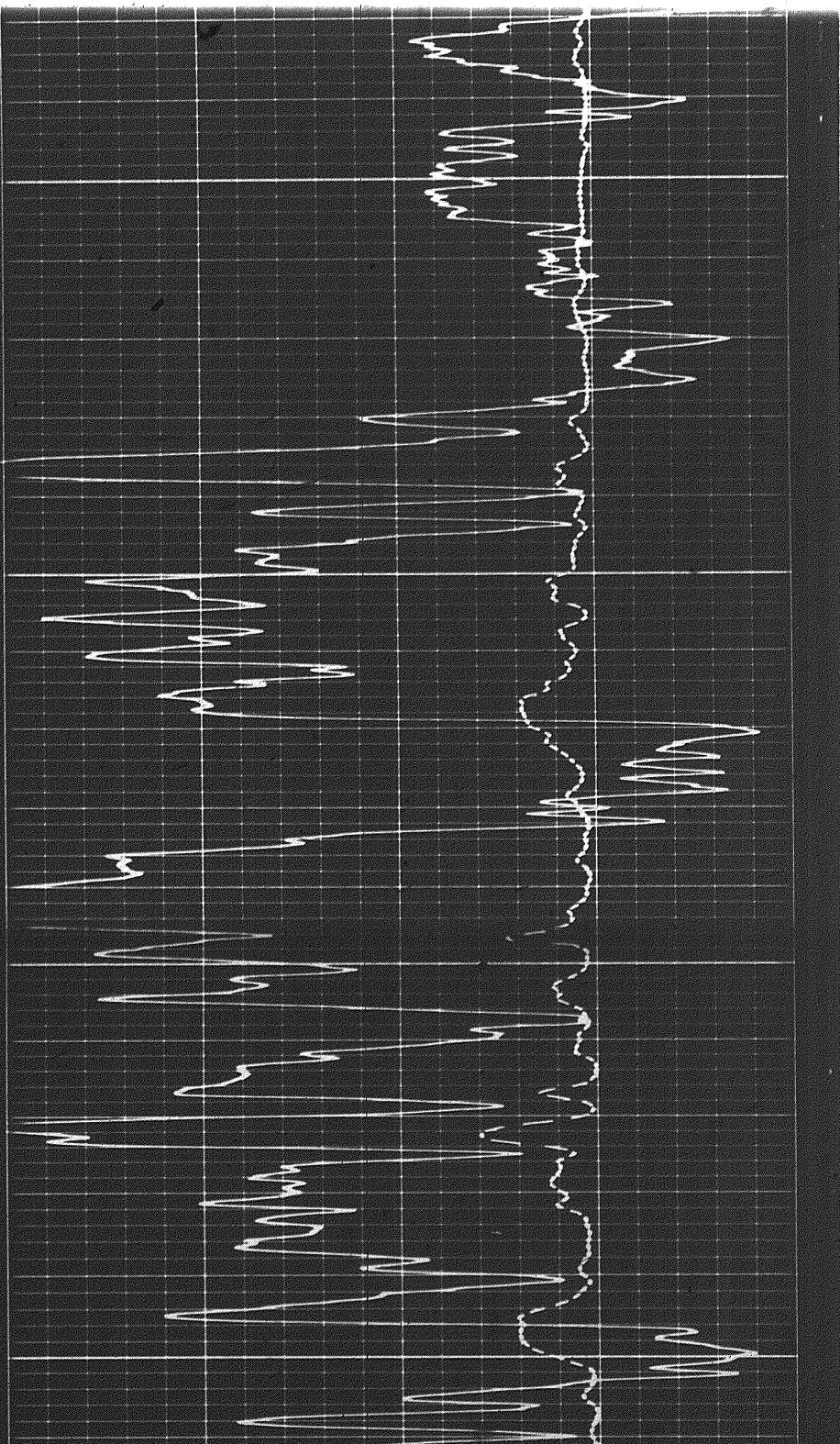
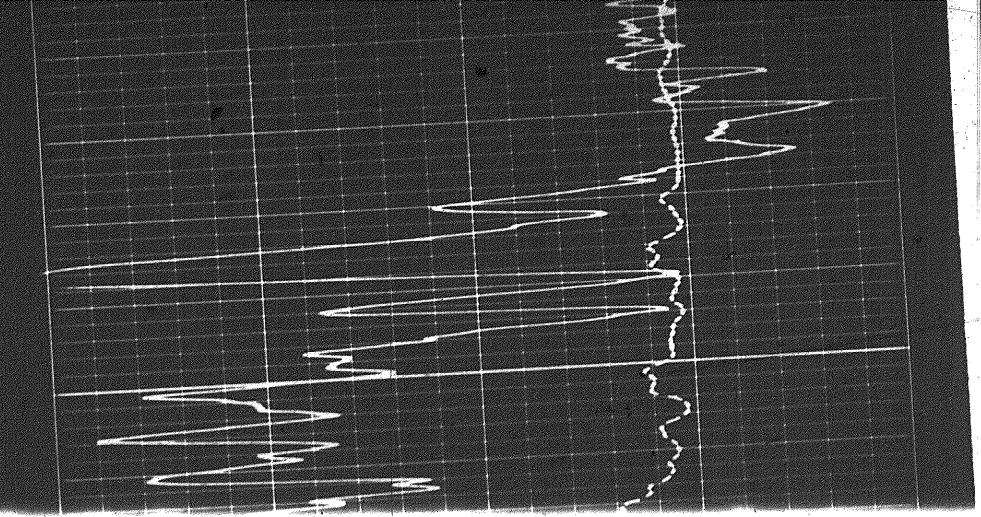


13200

13300

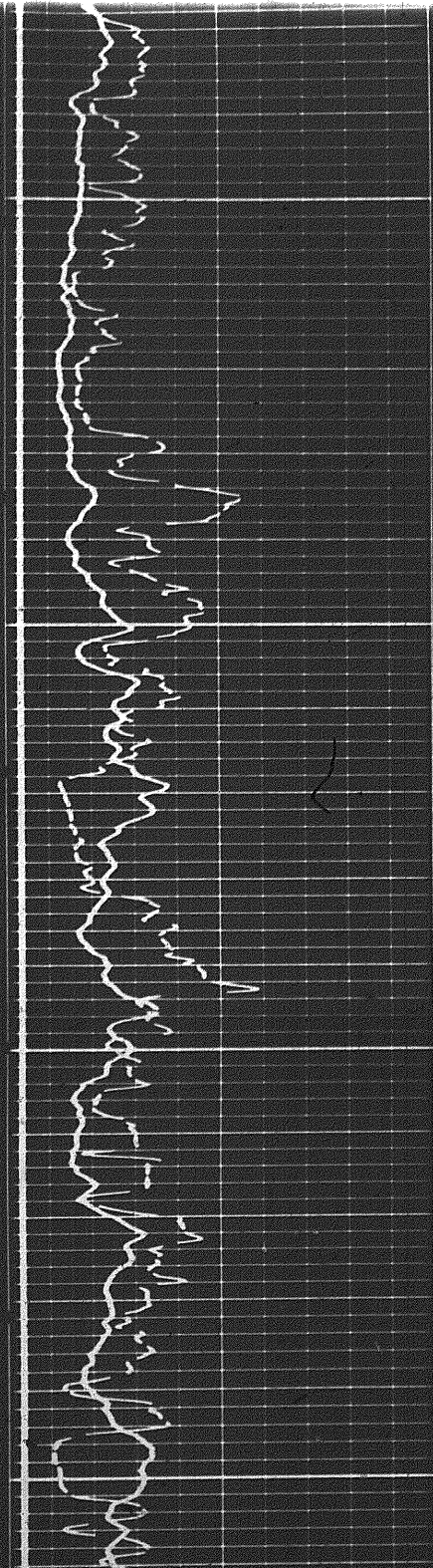
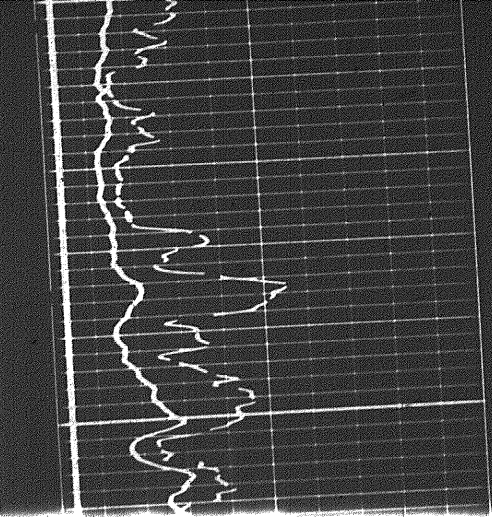
13400

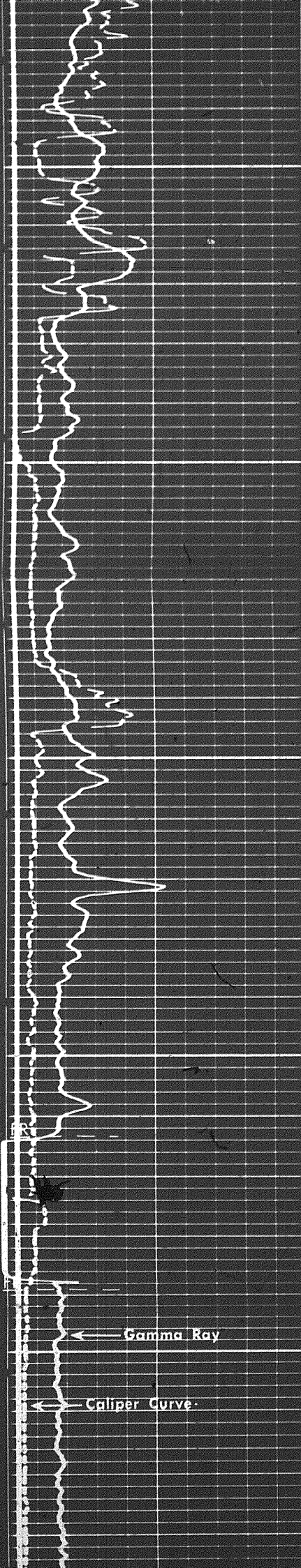




13400

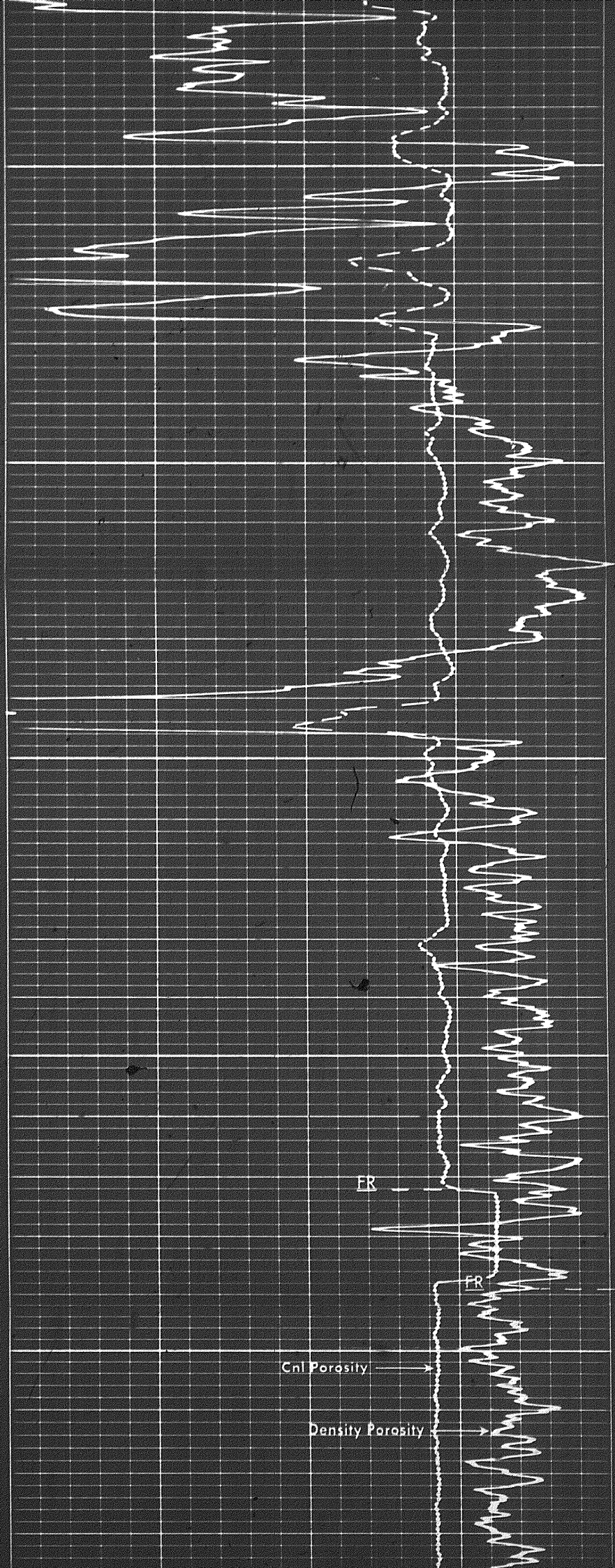
13500

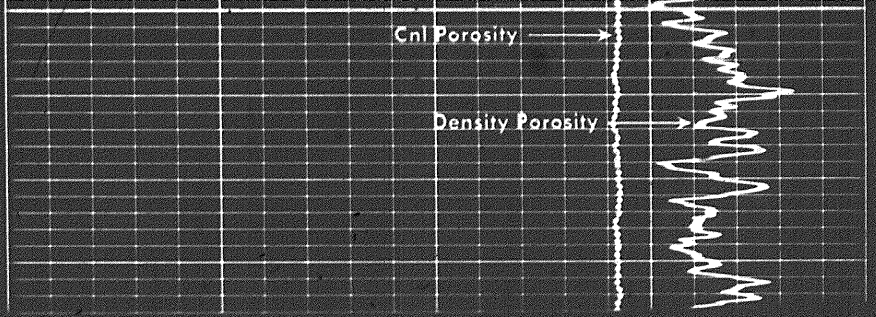
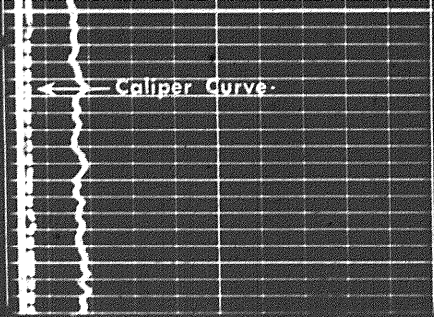




13600

13700

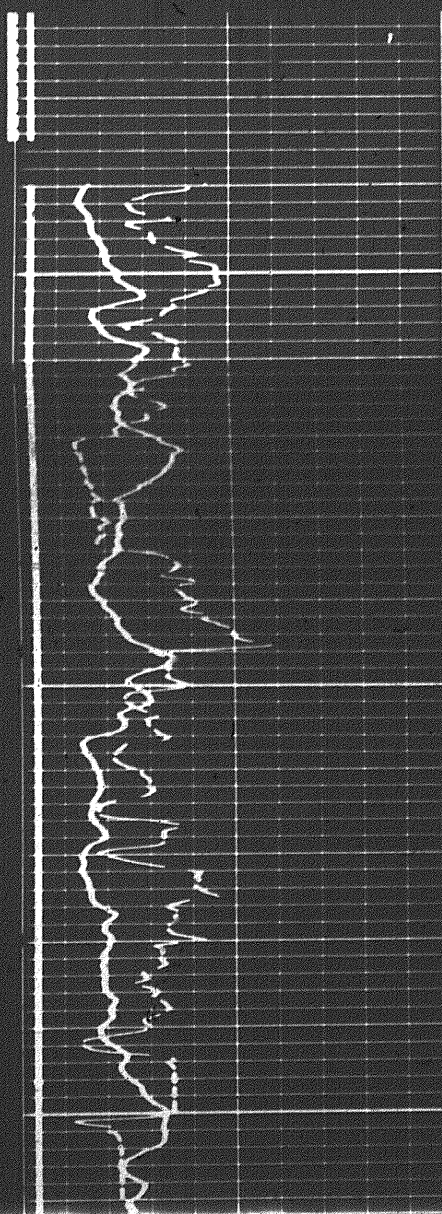




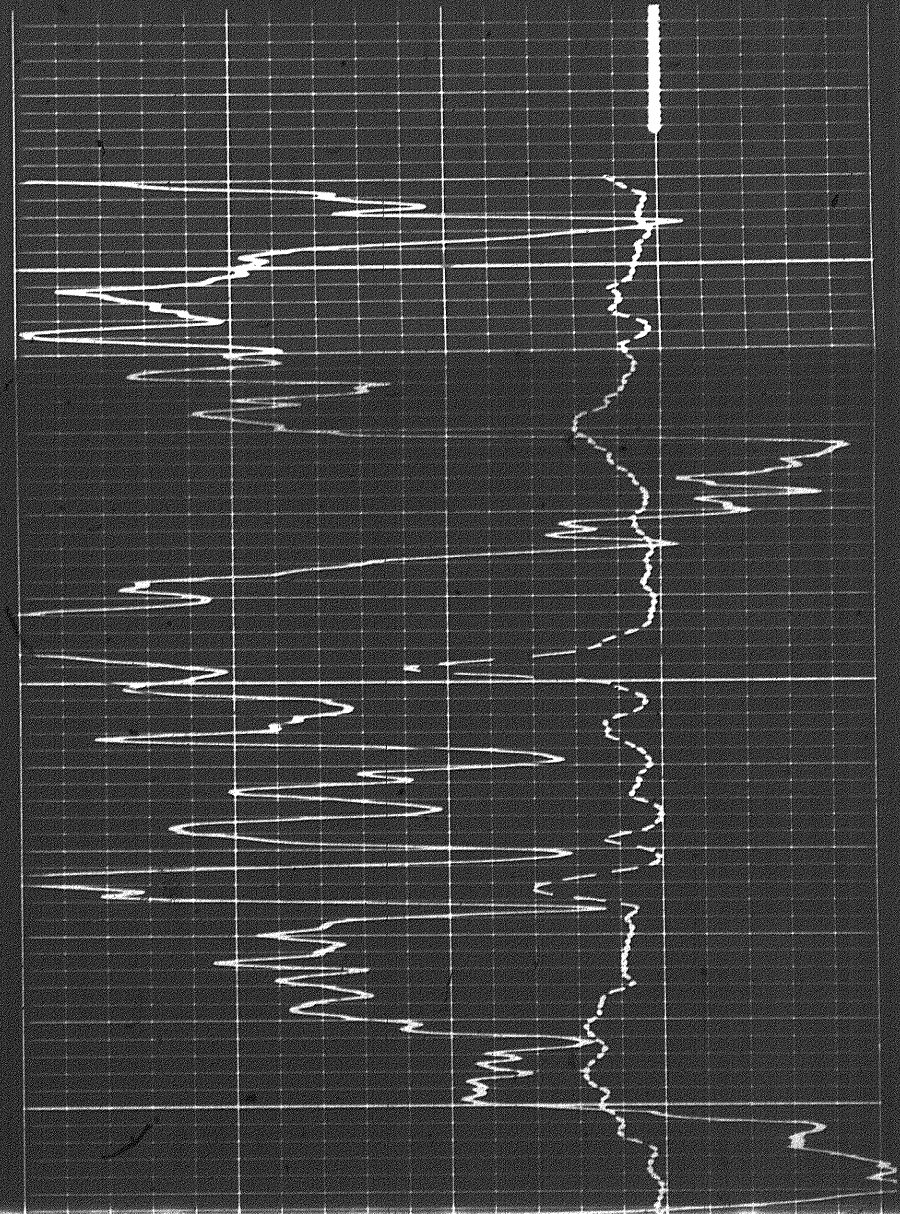
REPEAT SECTION

↓

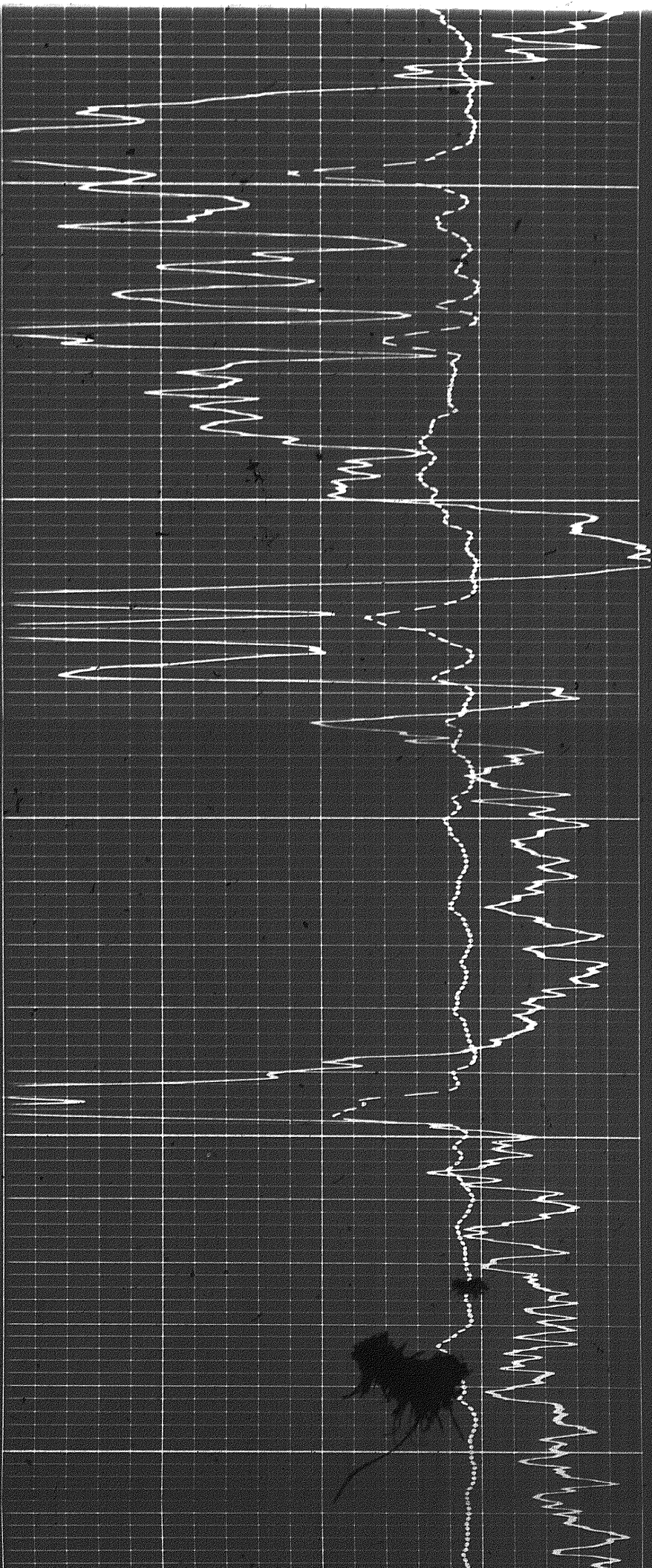
X 300X



13500



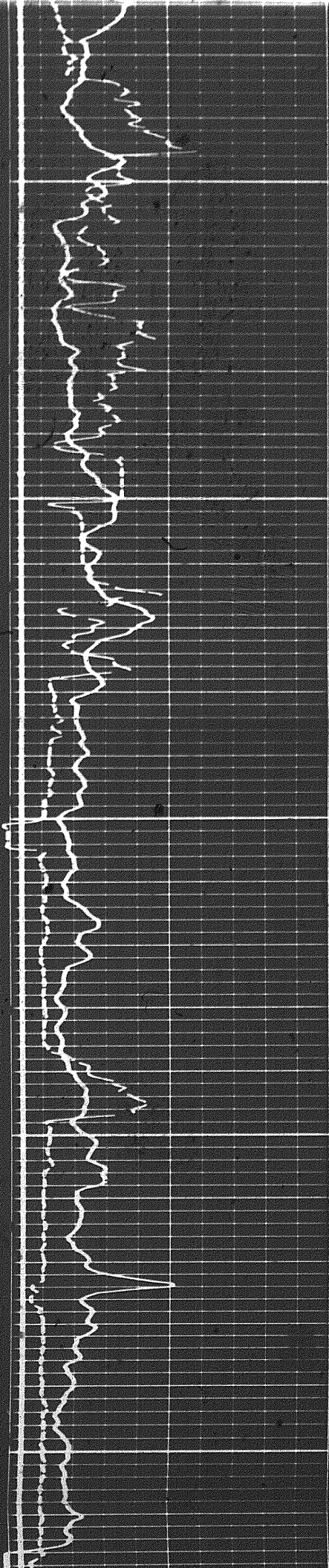


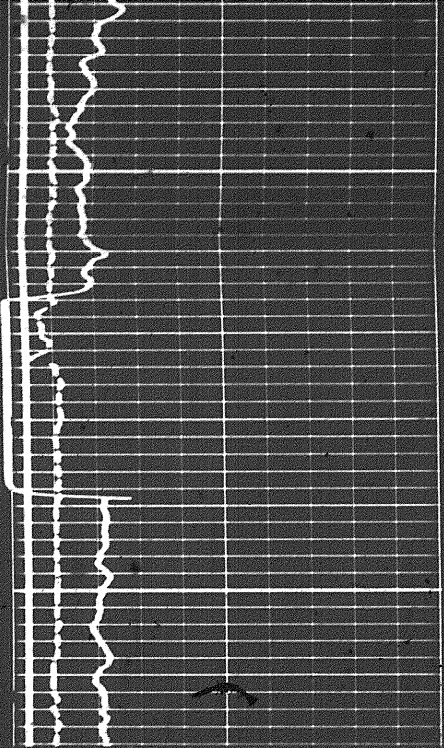


13500

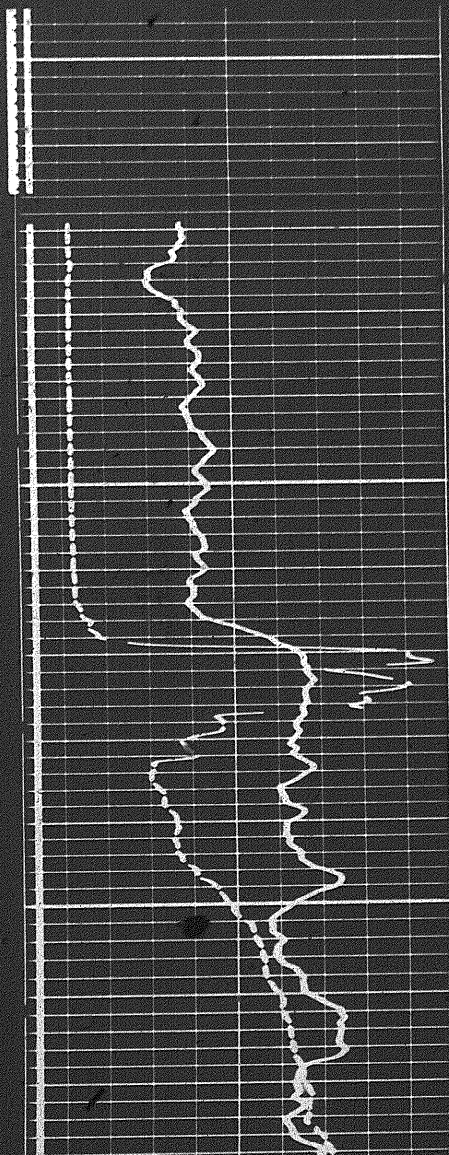
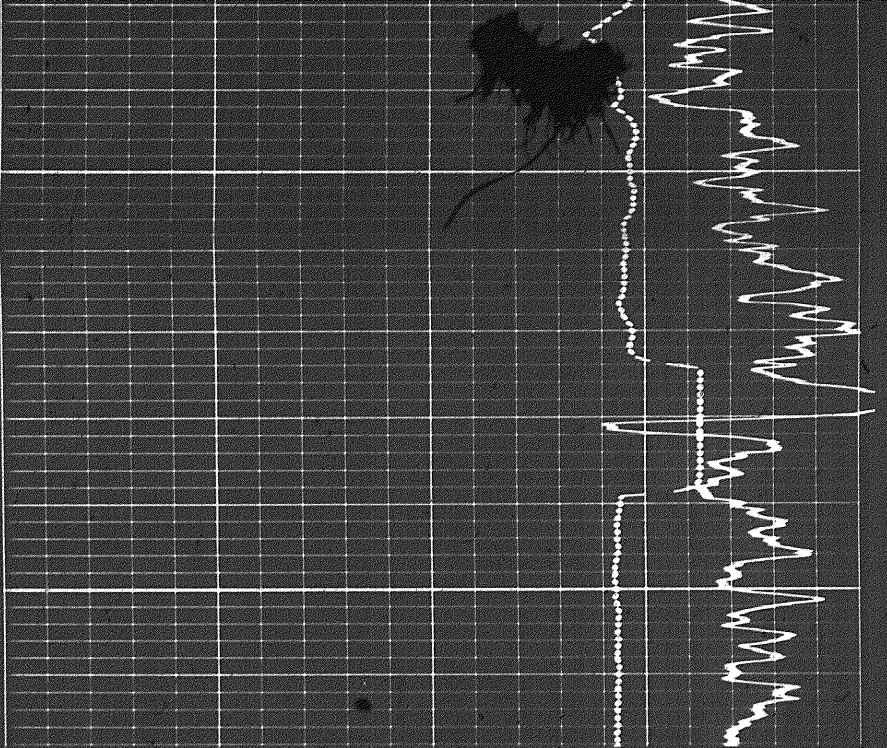
13600

13700

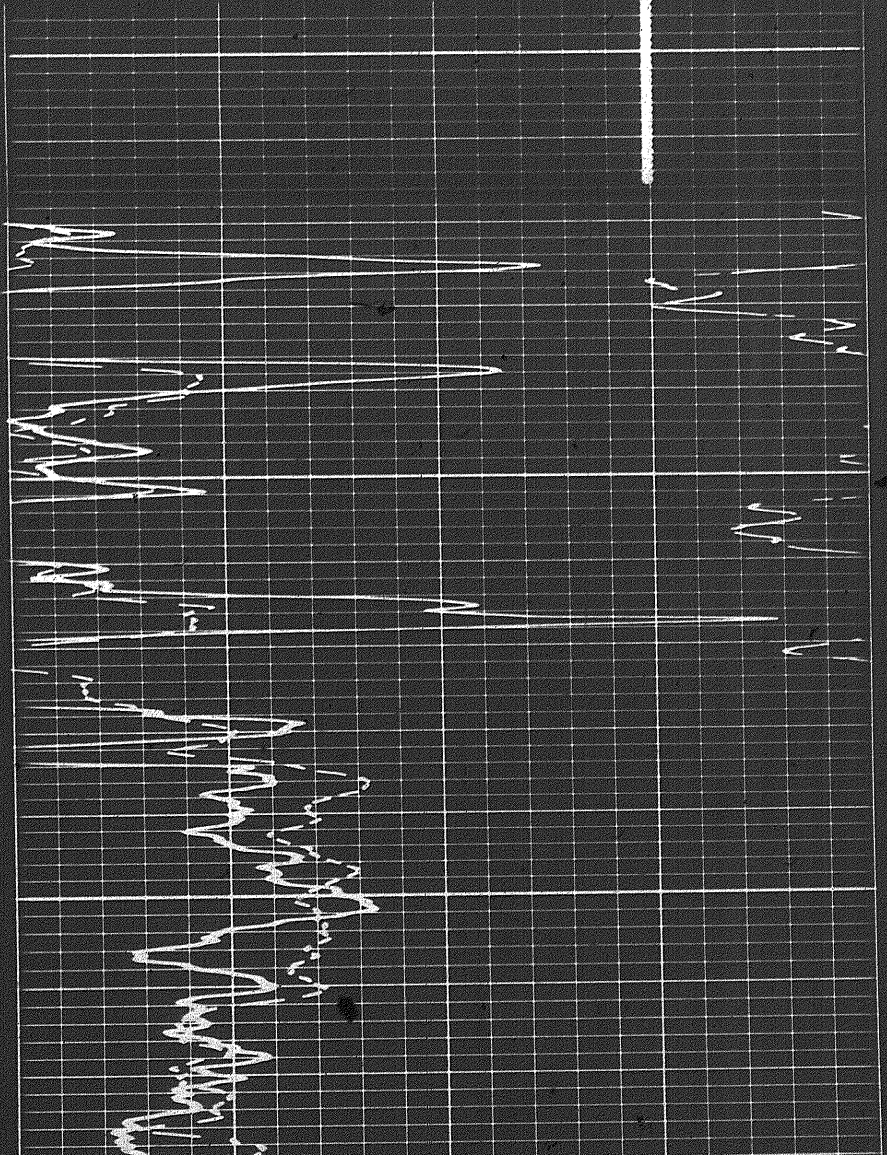




13700



9900

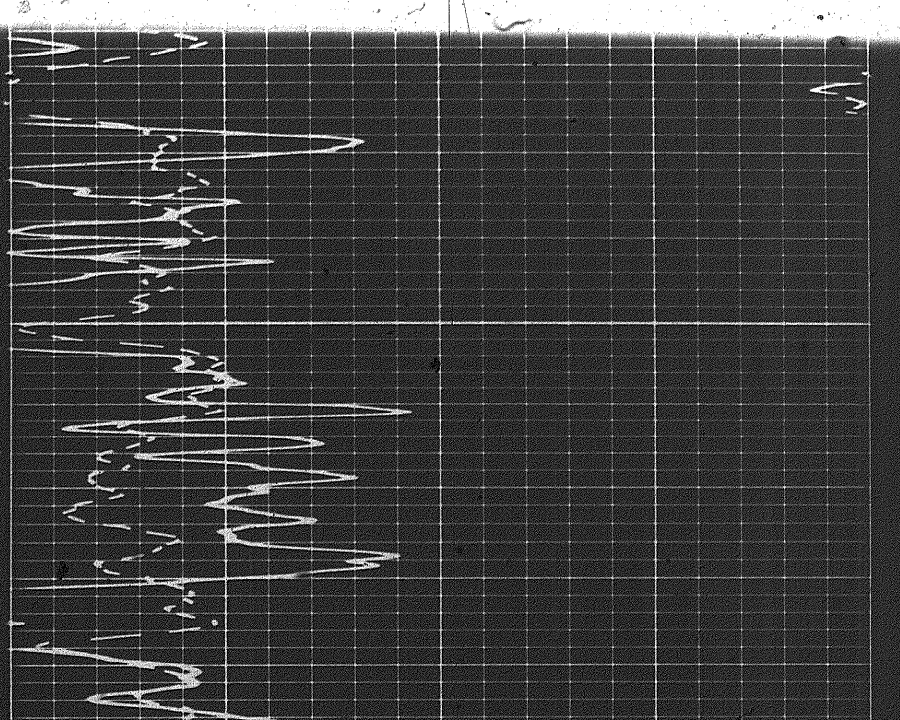
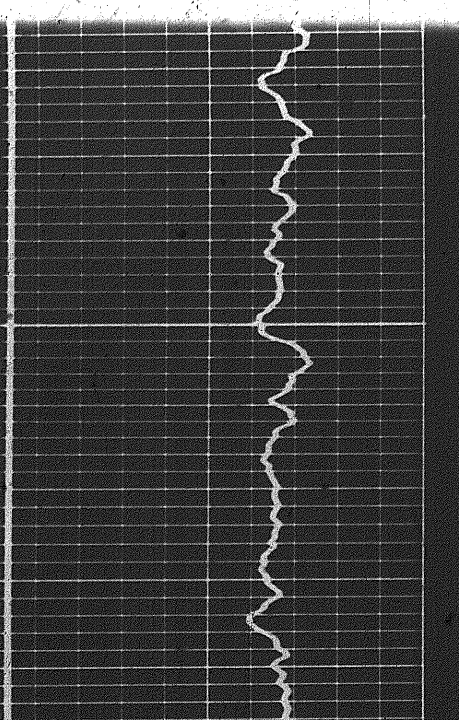
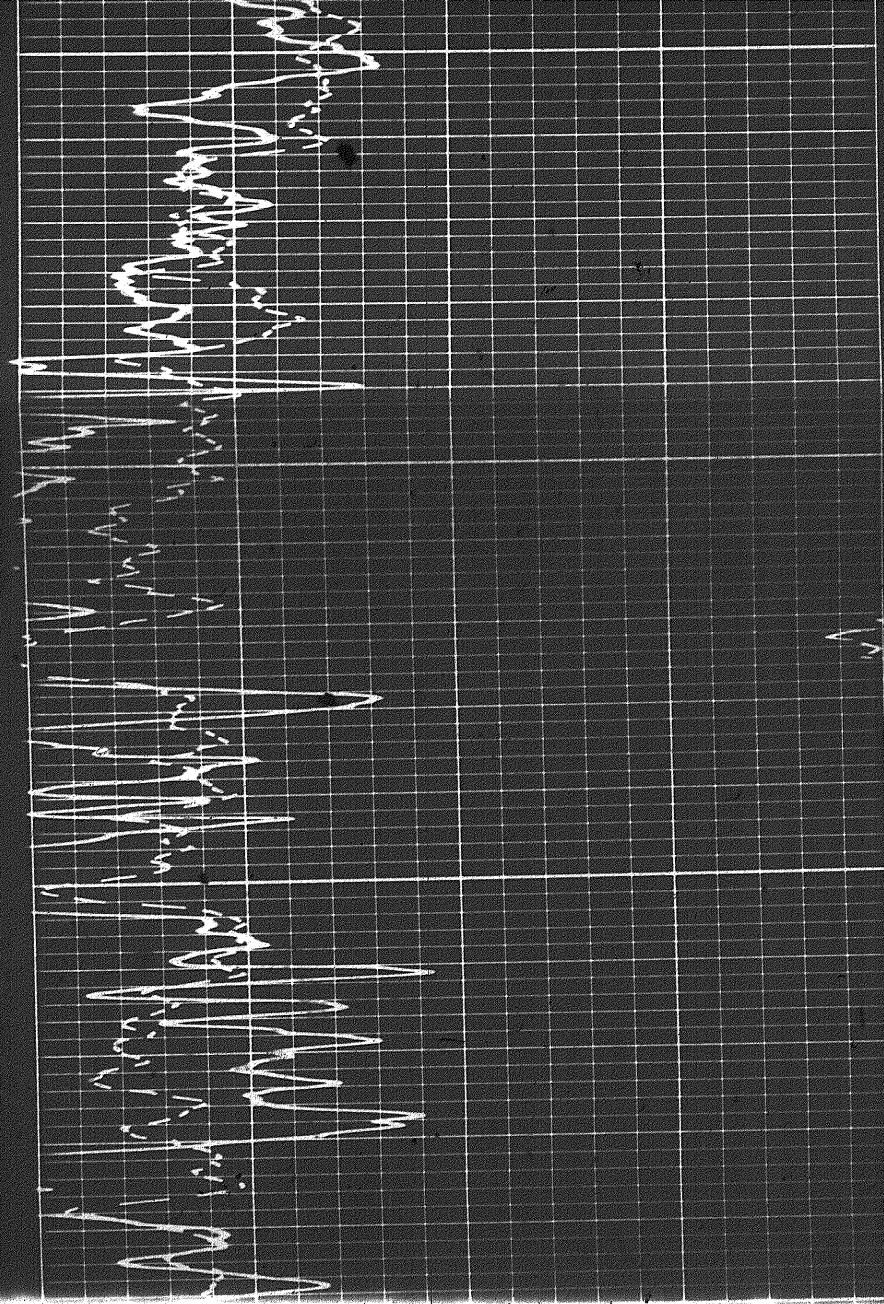
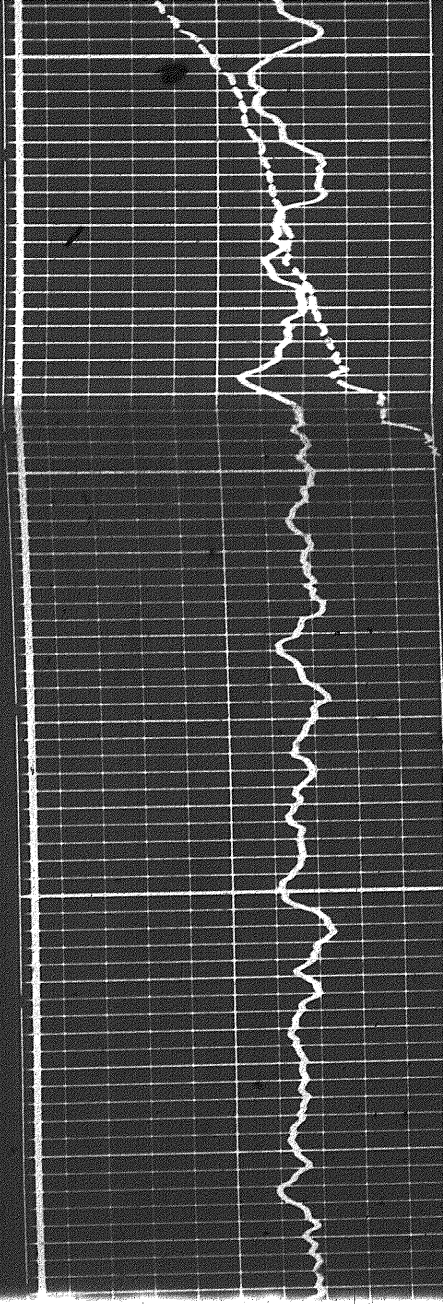


10000

00001

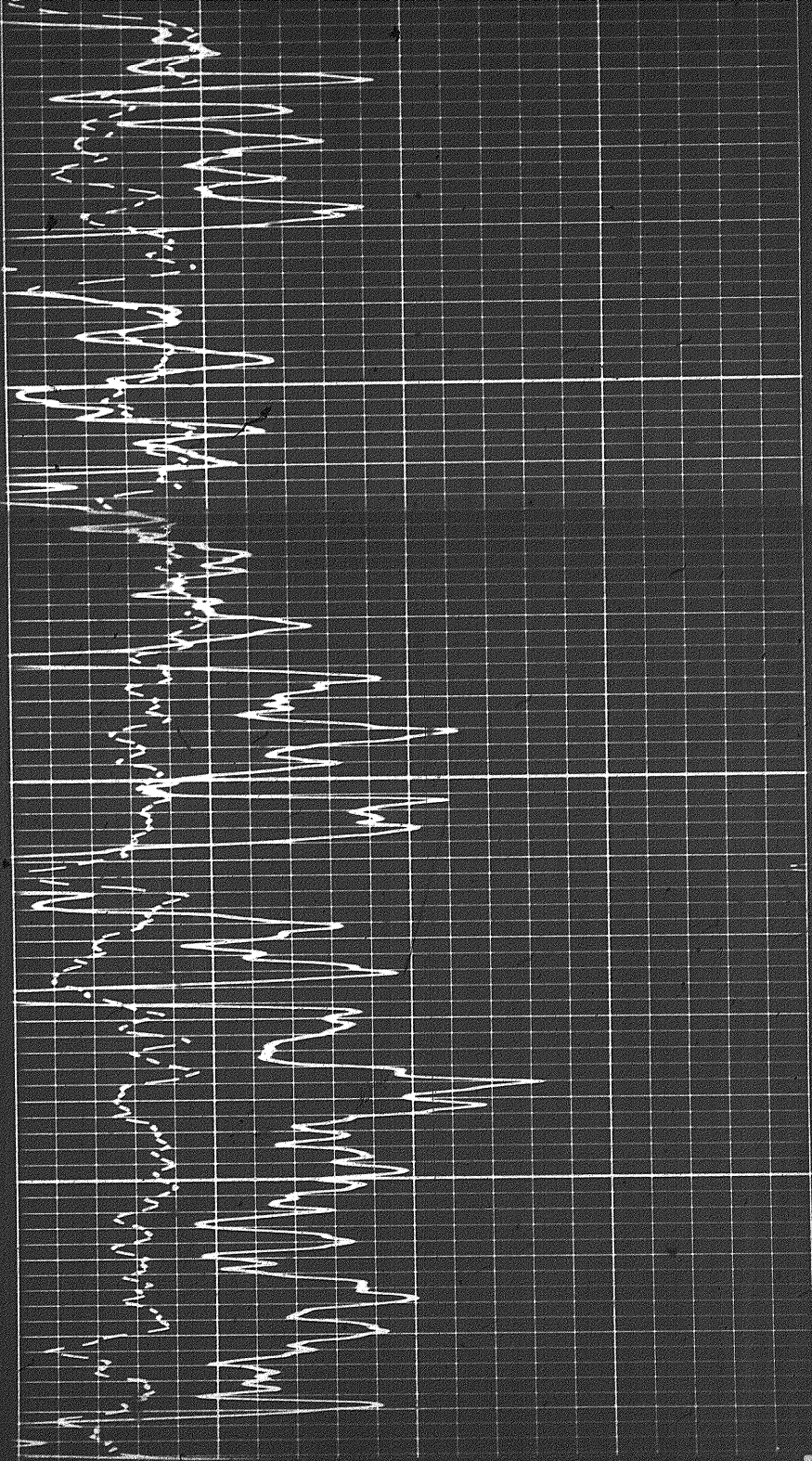
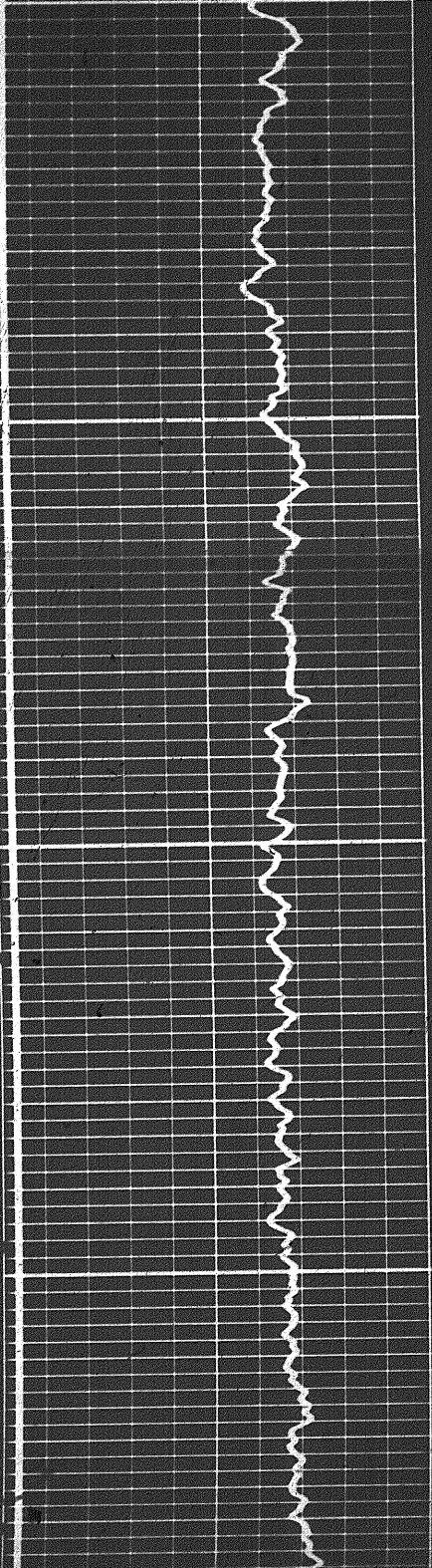
00101

00101



00

10200



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

150 300

GAMMA RAY  
 API UNITS

9 10 11 12 13 14 15 16 17

CALIPER

DEF

POROSITY (%)

NEUTRON POROSITY  
 OF LIMESTONE MATRIX

DENSITY POROSITY

$\rho_{\text{MATRIX}}$  2.71 gm/cc  $\rho_{\text{FLUID}}$  1.00 gm/cc

Speed in f.p.m.

ON LIMESTONE MATRIX

150  
300

30 20 10 0 -10

GAMMA RAY  
API UNITS

9 10 11 12 13 14 15 16 17

Speed in FPM

DENSITY POROSITY

ρ MATRIX 2.71 gm/cc ρ FLUID 1.00 gm/cc

CALIPER  
hole diameter in inches

DEPTH

POROSITY (%)

Calibration after Survey

13

12

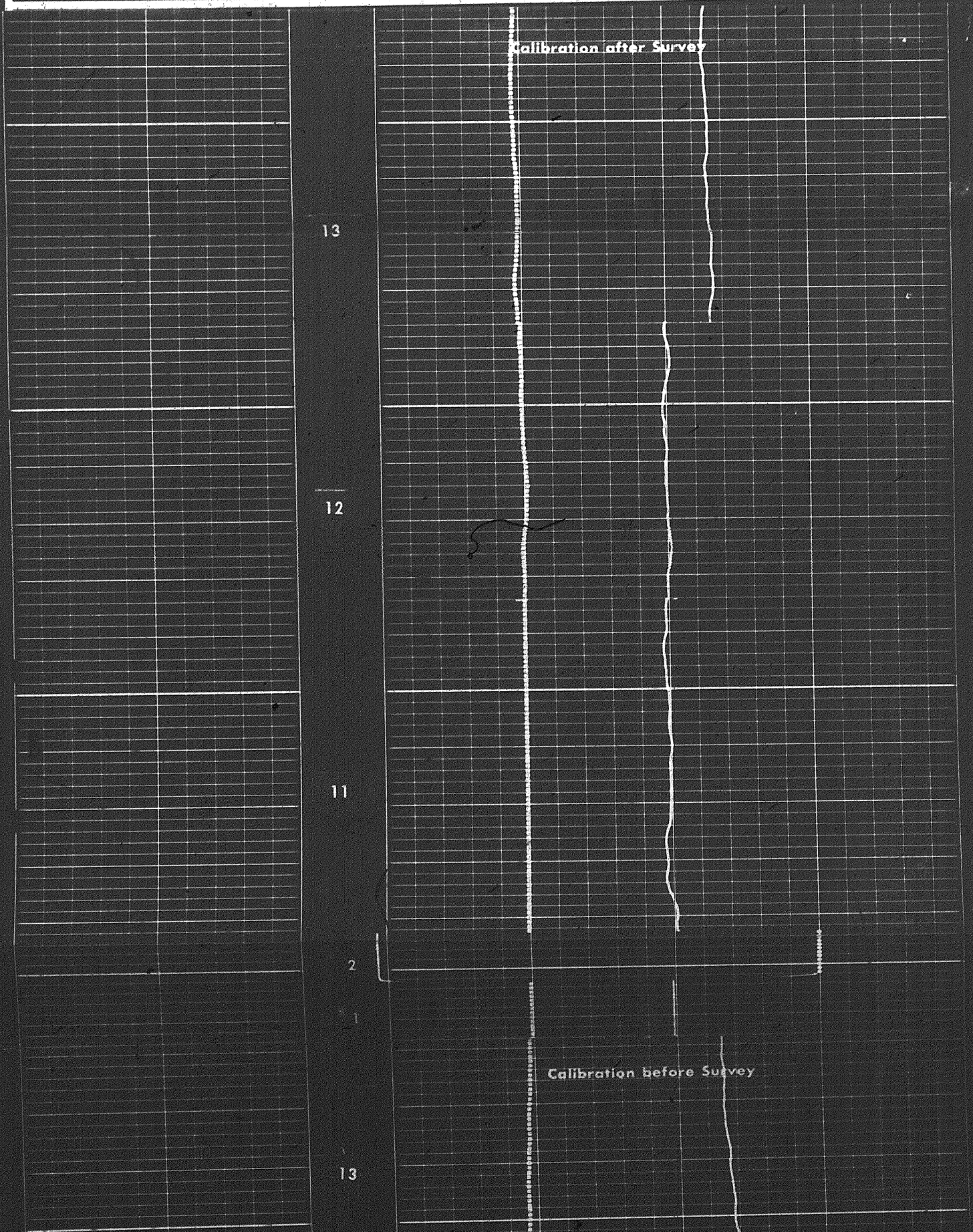
11

2

1

Calibration before Survey

13



13

12

13

12

11

11

10

9

8

7

6

5

4

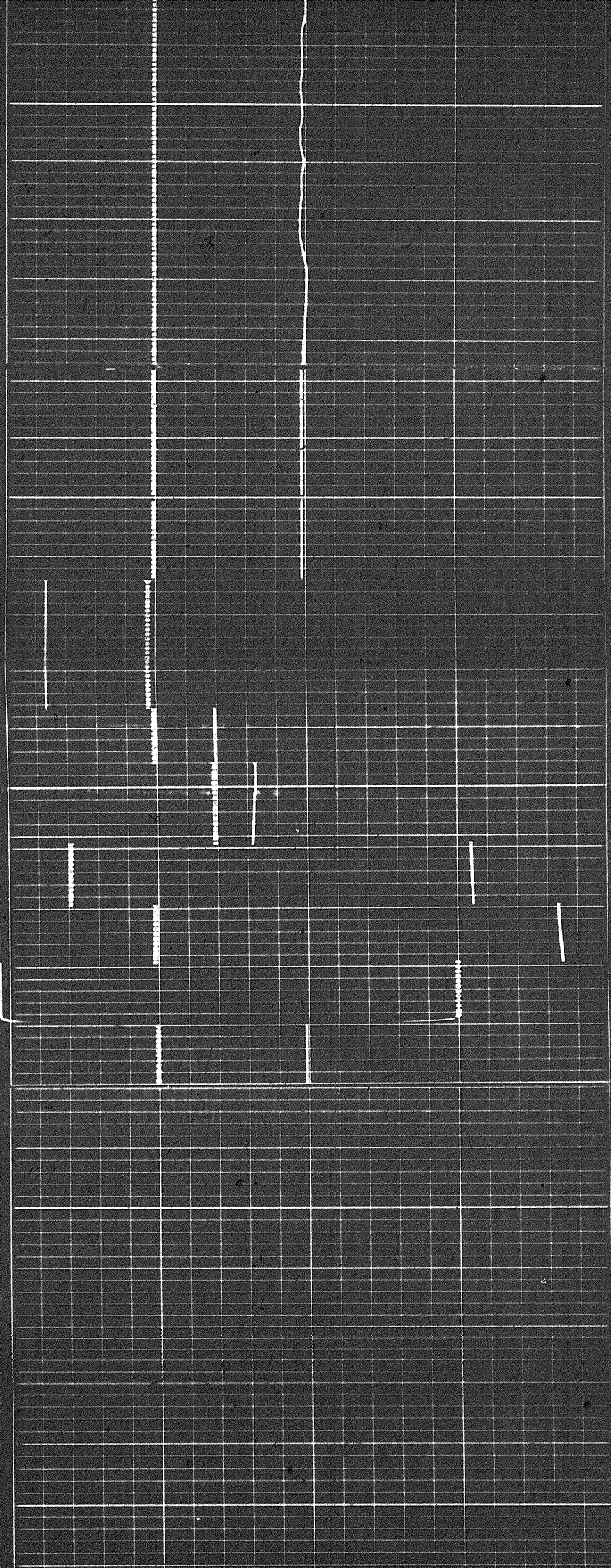
3

2

1

Calibration before Survey

6



5

4

3

1

2

Calibration after Survey

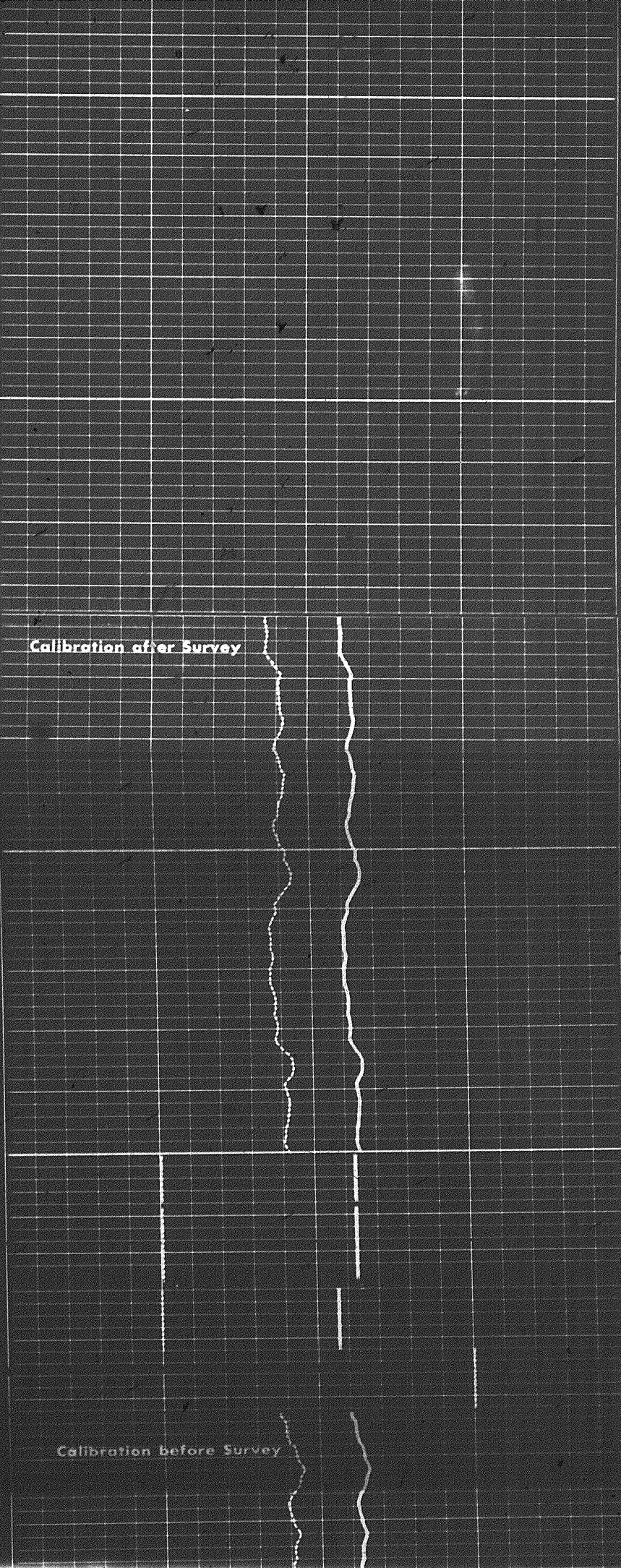
8

7

2

1

Calibration before Survey





7

2

1

Calibration Before Survey

8

7

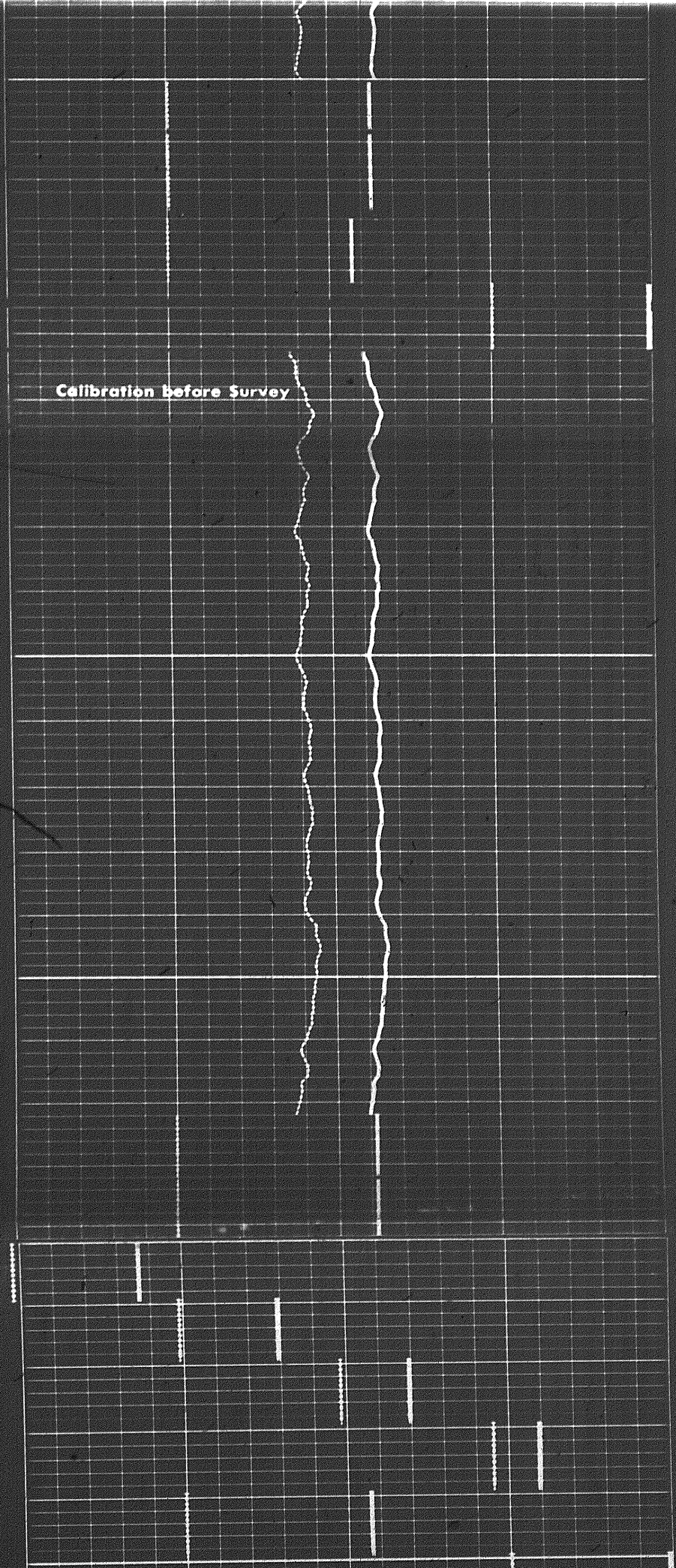
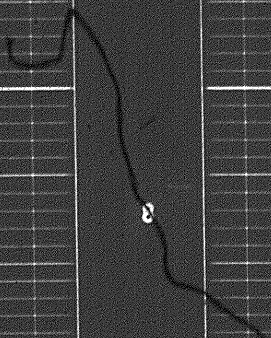
6

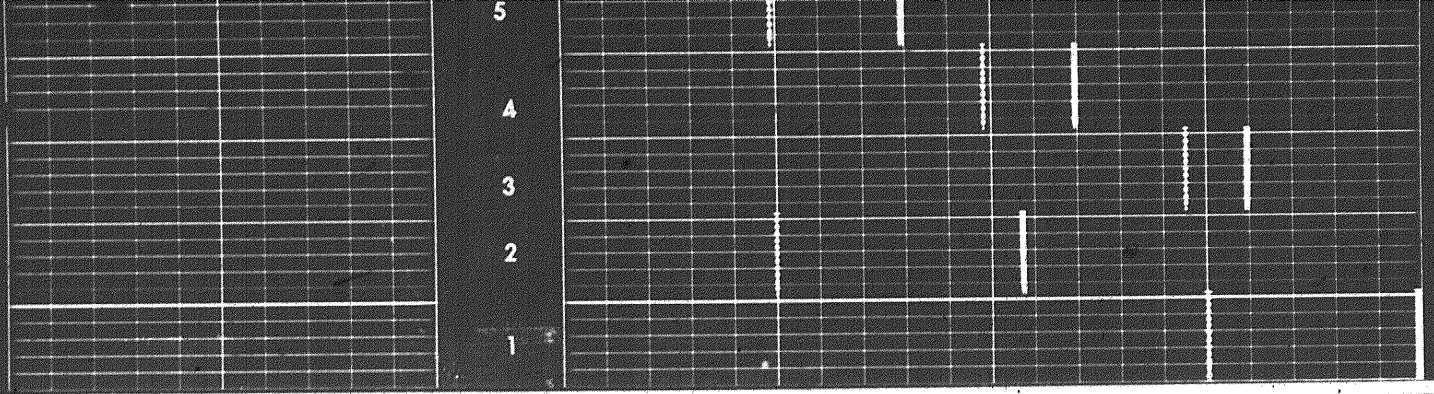
5

4

3

2





### FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
  2. RECORDER SENSITIVITY  
PANEL TEST  
FDC LIQUID
- |    | POS | $\rho$ | $\Delta\rho$ |
|----|-----|--------|--------------|
| 3. | H 1 | 2.92   | .00          |
| 4. | H 2 | 2.78   | + .14        |
| 5. | H 3 | 2.42   | - .10        |
| 6. | H 4 | 2.35   | .00          |
| 7. | H 5 | 2.08   | .01          |
8. MECHANICAL ZERO CALIPER
  9. 8" RING
  10. 12" RING
  11. TOOL CALIBRATE # 1 SET  $\rho = 2.50$
  12. TOOL CALIBRATE # 2 SET  $\Delta\rho = .00$
  13. LOG POSITION  $\rho = 2.59, \Delta\rho = .015$

### GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATE - SOURCE IN PLACE

### COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

	RATIO	PANEL TEST				
		OH			CH	
		LS <input type="checkbox"/>	SS <input type="checkbox"/>	DOL <input type="checkbox"/>	SS <input type="checkbox"/>	LS <input type="checkbox"/>
3.	1	1.6	4.9	-0.2	2.4	0.1
4.	2	15.6	19.7	8.1	13.0	9.0
5.	3	30.5	36.0	25.2	29.1	24.1
6.	4	45.4	53.1	47.5	47.4	43.2

7. POROSITY NORMALIZED WITH CNB-A IN PLACE
- 7A. TOOL IN NCT-B
8. LOG POSITION WITH CNB-A IN PLACE
- 8A. LOG POSITION WITH TOOL IN NCT-B

	OH			CH	
	LS	SS	DOL	SS	LS
	18	22.2	10.4	15.3	11.2

$$\text{RATIO (NORMALIZED)} = \frac{2.17}{\text{RATIO (NCT-B)}} \quad \text{RATIO (LOG)}$$

COMPANY \_\_\_\_\_  
 WELL \_\_\_\_\_  
 FIELD \_\_\_\_\_  
 PROVINCE \_\_\_\_\_

SCHL. FR \_\_\_\_\_  
 SCHL. TD \_\_\_\_\_  
 DRLP. TD \_\_\_\_\_  
 Elev. \_\_\_\_\_  
 KB \_\_\_\_\_  
 DF \_\_\_\_\_  
 GL \_\_\_\_\_

# COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

RATIO	PANEL TEST					POROSITY	
	OH			CH			
	LS <input checked="" type="checkbox"/>	SS <input type="checkbox"/>	DOL <input type="checkbox"/>	SS <input type="checkbox"/>	LS <input type="checkbox"/>		
3.	1	1.6	4.9	-0.2	2.4	0.1	
4.	2	15.6	19.7	8.1	13.0	9.0	
5.	3	30.5	36.0	25.2	29.1	24.1	
6.	4	45.4	53.1	47.5	47.4	43.2	

7. POROSITY NORMALIZED WITH CNB-A IN PLACE

7A. TOOL IN NCT-B

8. LOG POSITION WITH CNB-A IN PLACE

8A. LOG POSITION WITH TOOL IN NCT-B

OH			CH		
LS	SS	DOL	SS	CH	LS
18	22.2	10.4	15.3	11.2	

$$\text{RATIO (NORMALIZED)} = \frac{2.17}{\text{RATIO (NCT-B)}} \quad \text{RATIO (LOG)}$$

COMPANY \_\_\_\_\_ LTD

WELL \_\_\_\_\_

FIELD \_\_\_\_\_

PROVINCE \_\_\_\_\_

SCHL. FR \_\_\_\_\_

SCHL. TD \_\_\_\_\_

DRLR. TD \_\_\_\_\_

Elev. \_\_\_\_\_

KB \_\_\_\_\_

DF \_\_\_\_\_

GL \_\_\_\_\_

MASTER CALIBRATION

OCT 4, 1977

PDH-D-334

SFT-106-526

$\rho_1 = 426 \text{ cps}$

$\rho_2 = 713 \text{ cps}$

13

12

$\rho_{\text{COR.}}$

$\Delta \rho$

- 3. RECORDER SENSITIVITY
- 4. MEMORIZER ADJUSTMENT
- 5. BACKGROUND
- 6. CALIBRATE - SOURCE IN PLACE

COMPENSATED NEUTRON CALIBRATION CODING

- 1. MECHANICAL ZERO
- 2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

		PANEL TEST					
RATIO		OH			CH		
		LS	SS	DOL	SS	LS	
3.	1	1.6	4.9	0.2	2.4	0.1	
4.	2	15.6	19.7	8.1	13.0	9.0	
5.	3	30.5	36.0	25.2	29.1	24.1	
6.	4	45.4	53.1	47.5	47.4	43.2	
7.	POROSITY NORMALIZED WITH CNB A IN PLACE						
	7A. TOOL IN NCT B						
8.	LOG POSITION WITH CNB A IN PLACE						
	8A. LOG POSITION WITH TOOL IN NCT B						
		LS	SS	DOL	SS	LS	
		18	22.2	10.4	15.3	11.2	
		RATIO (NORMALIZED) $\frac{2.17}{\text{RATIO (NCT B)}}$		RATIO (LOG)			

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD  
 WELL COLUMBIA ET AL KOTANEELEE YT E-37  
 FIELD WILDCAT  
 PROVINCE YUKON

SCHL. FR 13739.0  
 SCHL. TD 13740.0  
 DRLR. TD 13750.0  
 Elev.:  
 KB 2038.0  
 DF \_\_\_\_\_  
 GL 2013.0

MASTER CALIBRATION

Oct 4, 1977

FDH-D-334

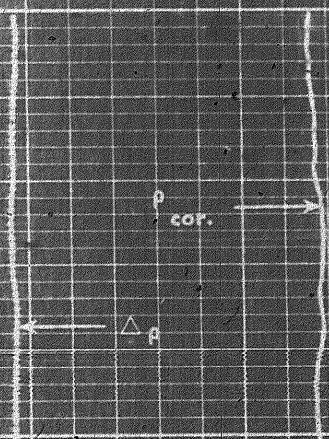
SFT-106-526

$\rho = 426$  cps

$\rho_0 = 713$  cps

13

12



11

2

1

$\Delta\rho$   $\rho_{cor.}$

DEPTH

PRIMARY CALIBRATION

CNC-A 428  
CNH-A 429  
CNB-A 162  
15 AUG '78  
RATIO 2.20

5.0

RATIO

2.5

0

NEUTRON POROSITY

45

30

OH L5 MATRIX

15

0

15

Spaced in FPM

Core Porosity

RATIO

8 A

7A

2