

Schlumberger

GL02617

SIMULTANEOUS  
COMPENSATED NEUTRON-  
FORMATION DENSITY

COUNTY CASSIA  
FIELD RAFT RIVER  
LOCATION NE/4 OF SW/4  
WELL RRGE #1  
COMPANY AEROJET NUCLEAR-  
INEL

COMPANY AEROJET NUCLEAR - INEL  
WELL RRGE #1  
FIELD RAFT RIVER GEOTHERMAL  
COUNTY CASSIA STATE IDAHO  
LOCATION NE/4 OF SW/4  
API SERIAL NO. SEC. 23 TWP. 15S RANGE 26E  
Other Services:  
DIL BHC-GR CBL  
TEMP. CAL.  
Permanent Datum: GL, Elev.: 4835  
Log Measured From: GL, --- Ft. Above Perm. Datum  
Drilling Measured From: GL, Elev.: 4835  
D.F. ---  
G.L. 4835

Date	2-2-75	4-6-75
Run No.	ONE	TWO
Depth-Driller	4632	5007
Depth-Logger	4620	5002
Btm. Log Interval	4619	4992
Top Log Interval	880	2692
Casing-Driller	20 @ 900	13-3/8@3642
Casing-Logger	900	3623
Bit Size	12-1/4	12-1/4
Type Fluid in Hole	WATER	FORMATION-WATER
Dens. Visc.	---	---
pH Fluid Loss	---	---
Source of Sample	PII	FLOWING
Rm @ Meas. Temp.	6.2 @ 54 °F	2.41 @ 114 °F
Rmf @ Meas. Temp.	---	---
Rmc @ Meas. Temp.	---	---
Source: Rmf Rmc	---	---
Rm @ BHT	1.35 @ 252 °F	0.9 @ 286 °F
Circulation Stopped	0230	2-2 WELL
Logger on Bottom	2130	212 FLOWING
Max. Rec. Temp.	266 °F	290 °F
Equip. Location	7710 R. S.	8002 R. S.
Recorded By	PARKS	PARKS
Witnessed By Mr.	STOKER	MILLER

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

RUN NO.	ONE	TWO	SCALE CHANGES			
Service Order No.	23855	23967	Type Log	Depth	Scale Up Hole	Scale Down Hole
Fluid Level	FULL	FULL				
Salinity, PPM CL.	---	---				
Speed - F.P.M.	30	---				

EQUIPMENT DATA			REMARKS: RUN ONE-RAT CAL - 2.273
Dens. Panel	E-654	653	
Dens. Cart.	---	661	
Dens. Skid.	E-38	E-38	
Dens. Sonde	EC-82	EC-32	
Dens. Source	5025	5025	
Dens. Calibrator	606	606	
Neut. Panel	A-76	384	
Neut. Cart.	A-85	A-85	
Neut. Source	F-139	F-132	
Neut. Calibrator	A-82	AB-476	
GR Cart.	J-92	J-92	
Memorizer Panel	AC-221	AC-207	
Tape Recorder (TTR)	E-1826	826	
Depth Encoder (DRE)	C-949	C-949	
Pressure Wheel (CPW)	---	---	
Centralizers:	Type EC. SPG.	EC. SPG.	
Enter Spring,	No. 1	1	
Standoffs,	S. O. - Inches	---	
In-line, or None	---	---	

CALIBRATION DATA			
GR	BKG. CPS	120	120
	Source CPS	580	580
	Sens. - Cal	CAL	CAL
	T. C. - Cal	CAL	CAL
TNC	Short Spacing - Before Log	1025	3080
	Long Spacing - Before Log	450	1280
	Short Spacing - After Log	1025	3080
	Long Spacing - After Log	450	1280
CDC	P1 - Before Log	474	474
	P2 - Before Log	808	808
	P1 - After Log	474	474
	P2 - After Log	808	808

LOGGING DATA												
DEPTH		CNP			FDC			GR				
Top	Bottom	Porosity Scale	Matrix	Auto Corr. or Hole Size Setting	Porosity Scale	Grain Density	Liquid Density	Hole Fluid	Sens. Logged	T. C.	Zero. Div. Left	Scale Per 100 Div.
880	4620	30/TK.	SS	AUTO	30/TK.	2.68	1.0	LIQ.	0-200	2	--	200
2692	4992	30/TK.	SS	AUTO	30/TK.	2.68	1.0	LIQ.	0-200	2	--	200

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 7 of our General Terms and Conditions as set out in our current Price Schedule.

DETAIL LOG  
5" = 100'

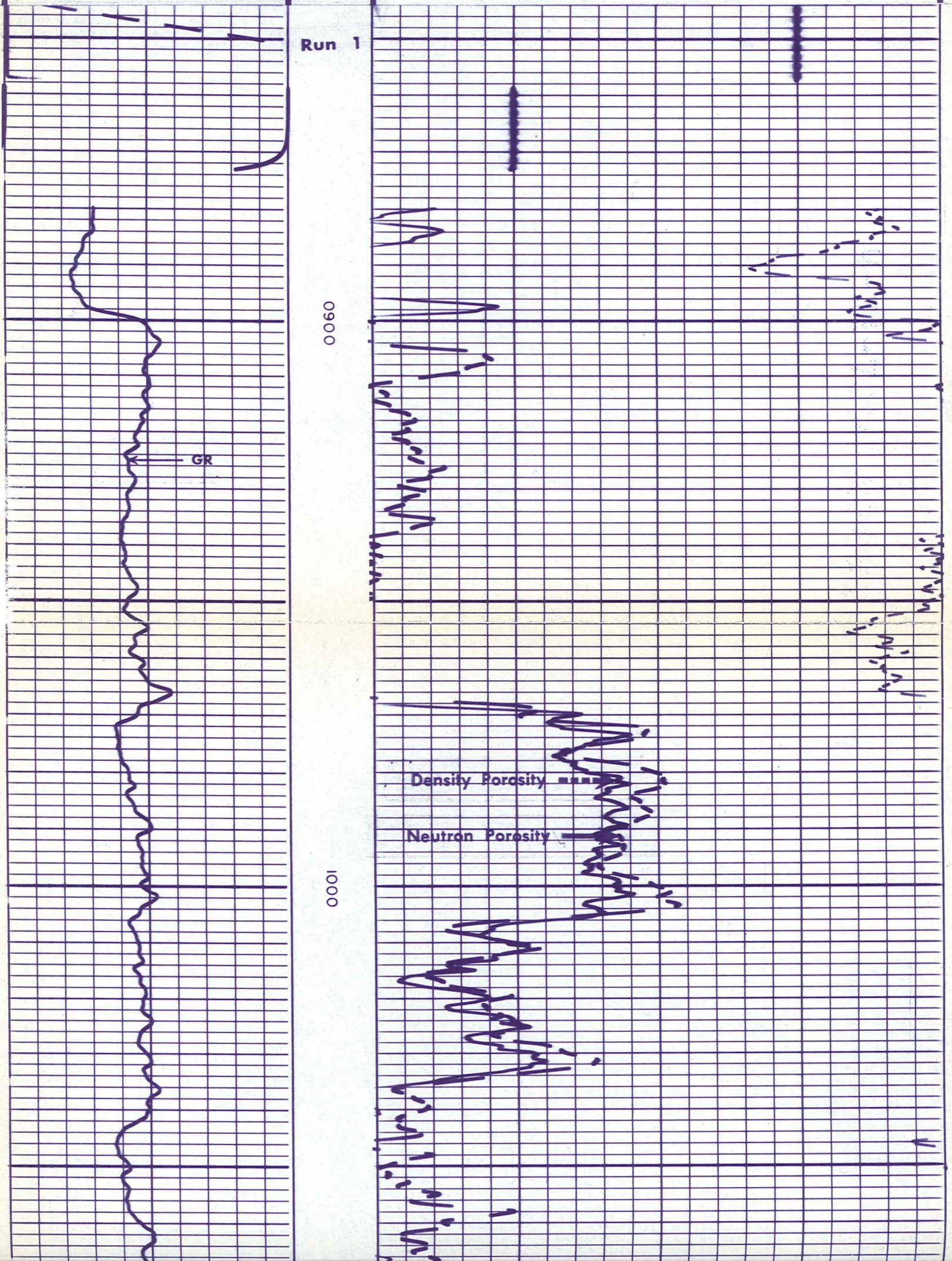
CALIPER HOLE DIAM. IN INCHES	DEPTHS	DENSITY POROSITY INDEX % SANDSTONE MATRIX
---------------------------------	--------	--

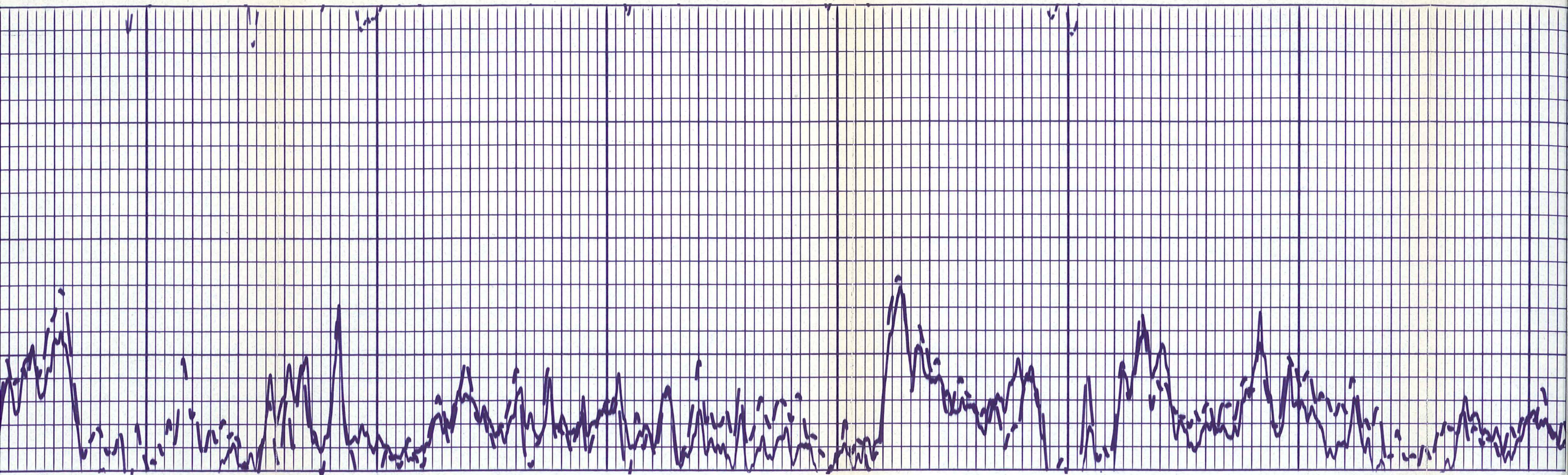
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, 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 7 of our General Terms and Conditions as set out in our current Price Schedule.

### DETAIL LOG

5" = 100'

CALIPER HOLE DIAM. IN INCHES	DEPTHS	DENSITY POROSITY INDEX % SANDSTONE MATRIX
10 ————— 20	45	30 ————— 15 ————— 0 ————— -15
GAMMA RAY API UNITS		NEUTRON POROSITY INDEX % SANDSTONE MATRIX
0 ————— 200	45	30 ————— 15 ————— 0 ————— -15
200 ————— 400		75 ————— 60 ————— 45

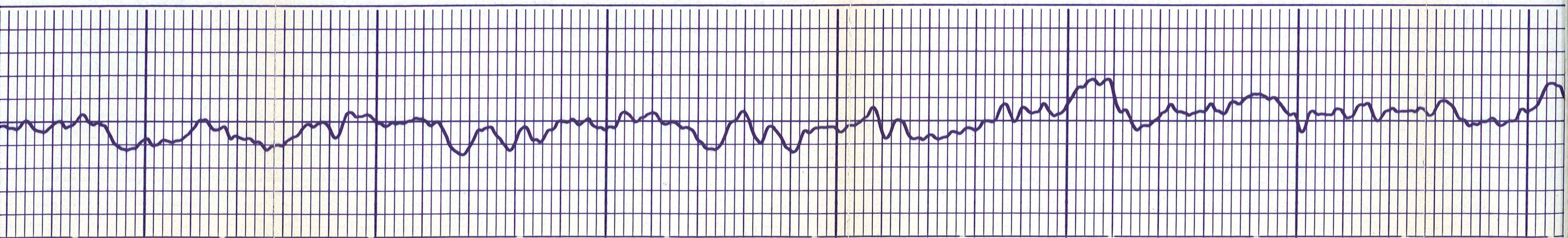


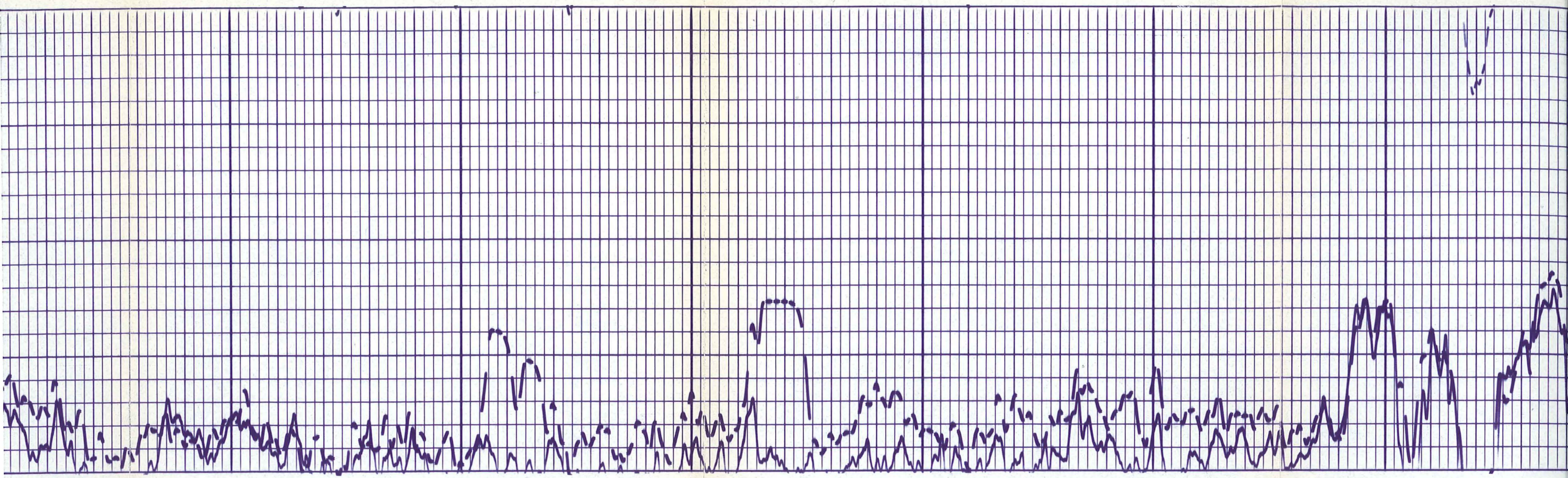


1100

1200

1300



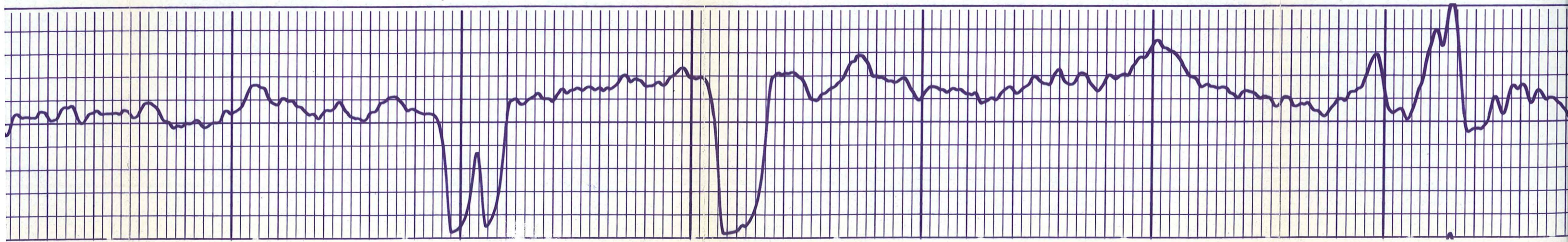


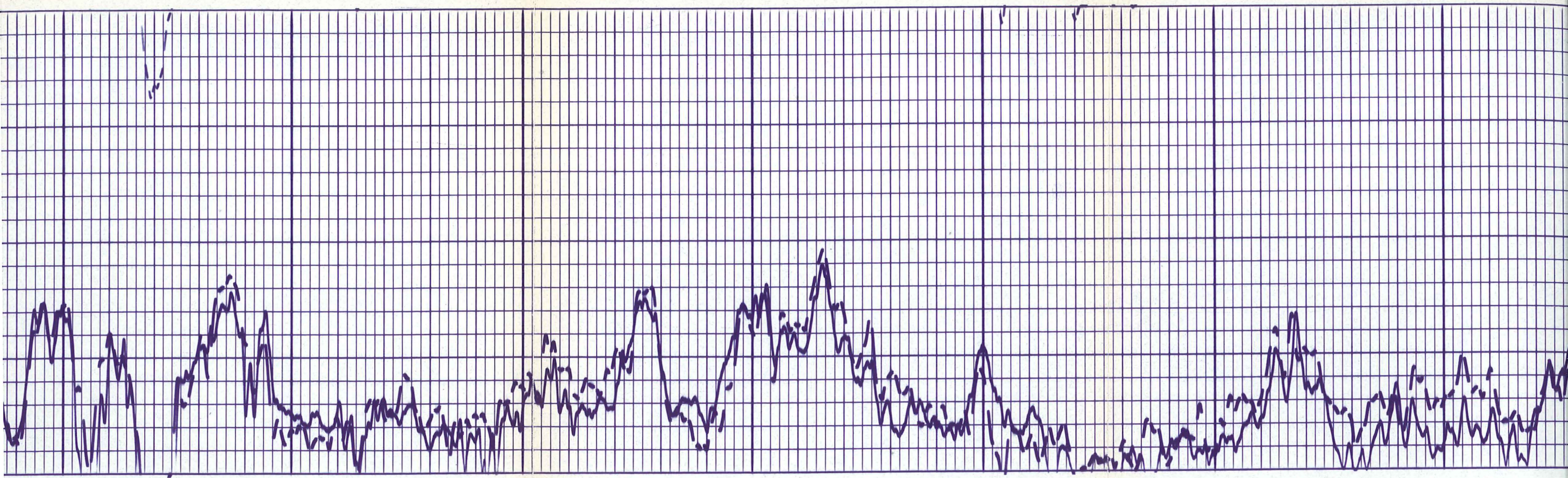
DO

1400

1500

1600



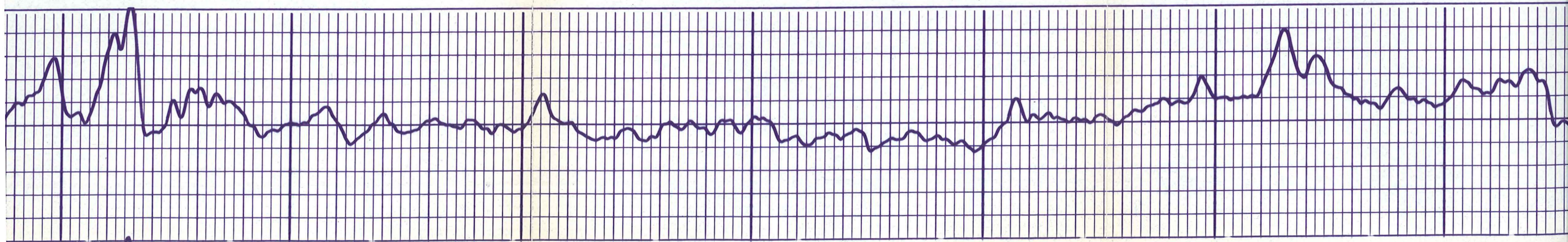


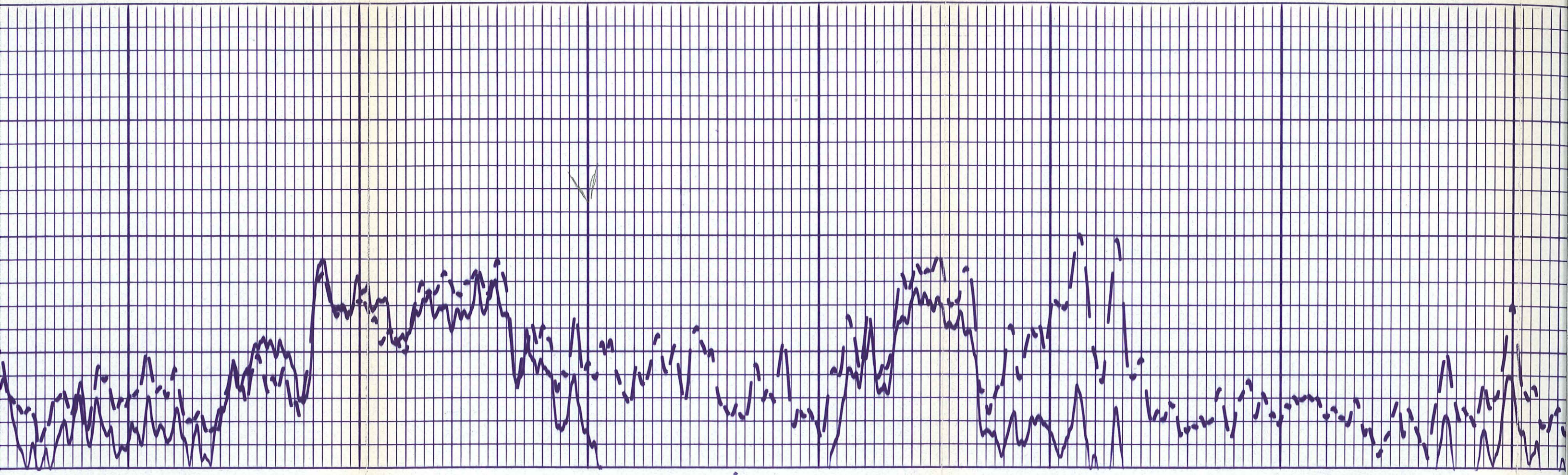
1600

1700

1800

1900



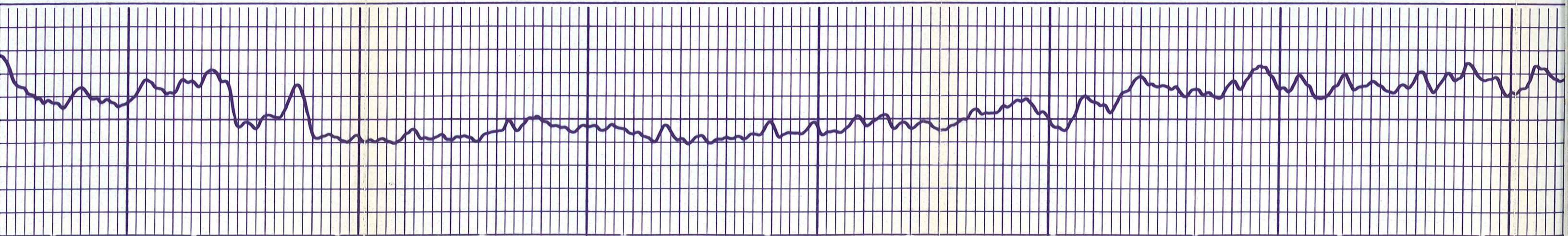


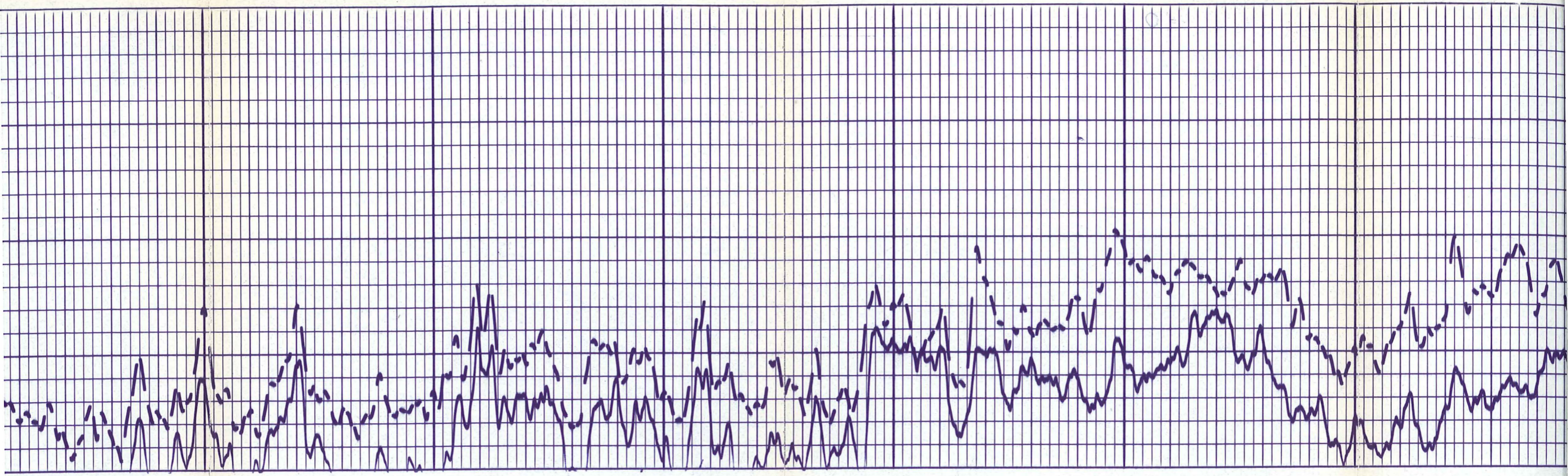
1900

2000

2100

2200



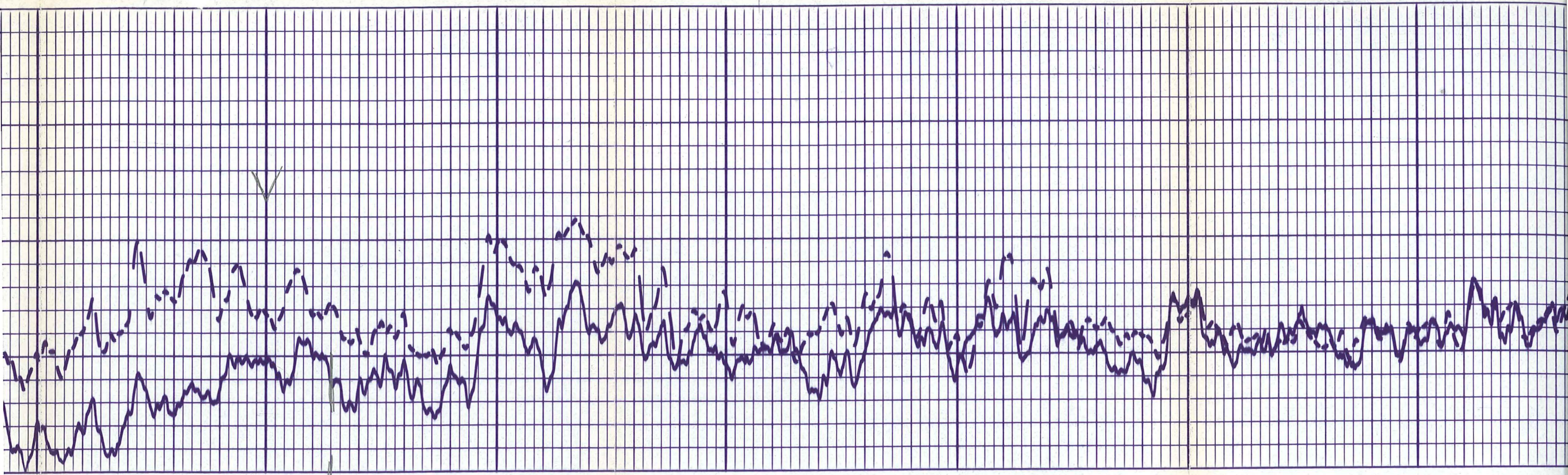


2200

2300

2400

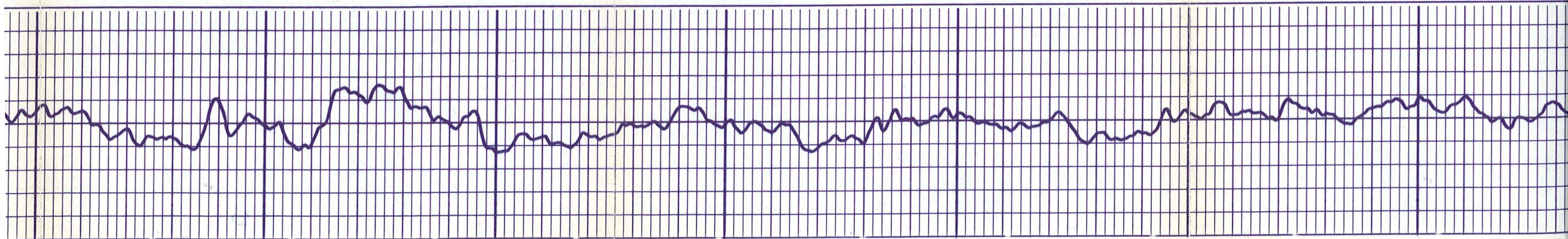




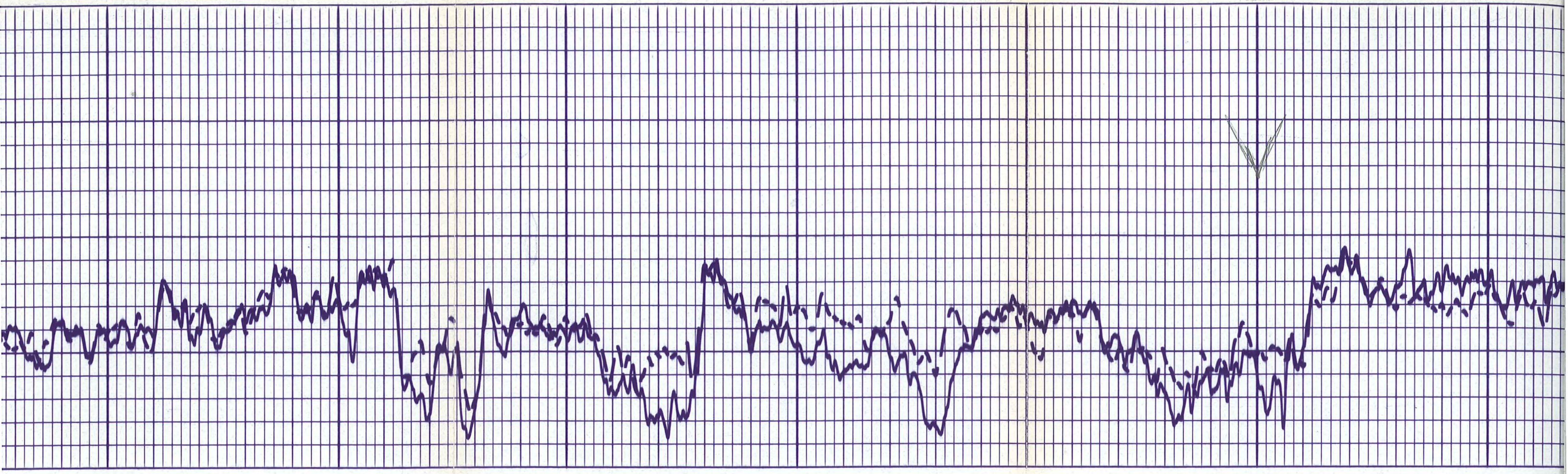
2500

2600

2700



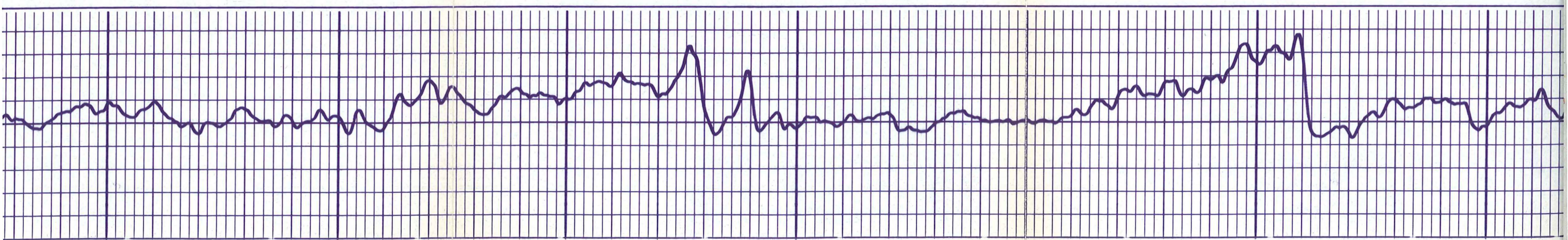


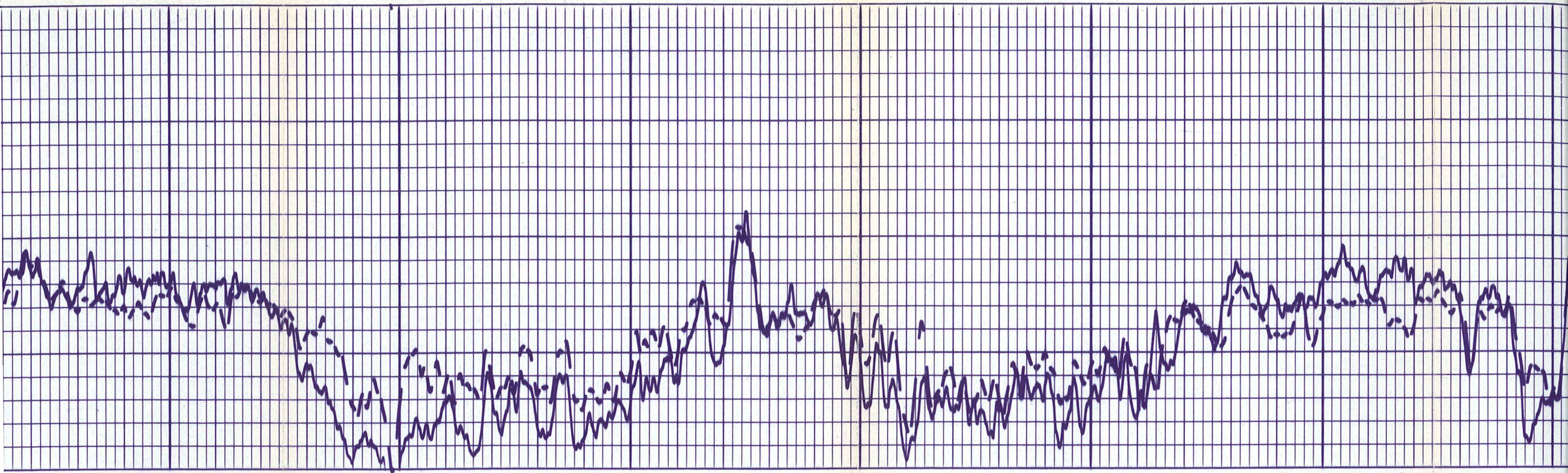


2800

2900

3000

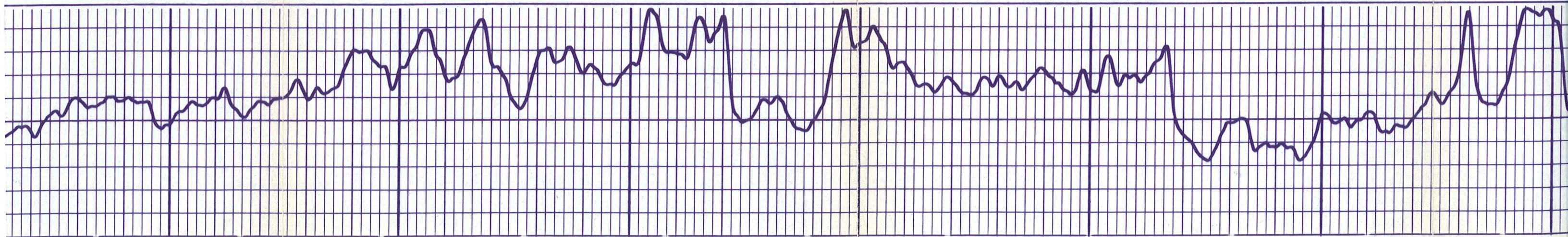


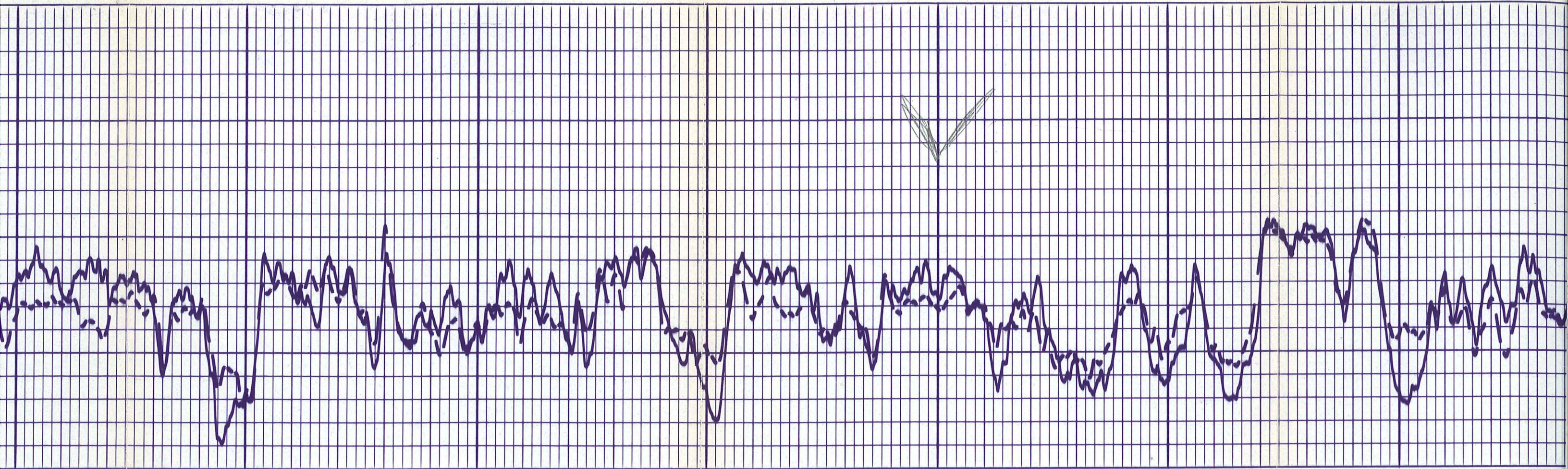


3100

3200

3300



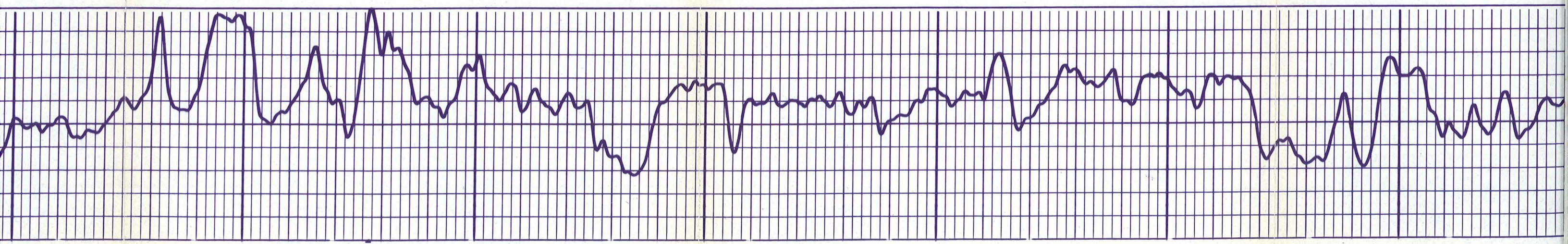


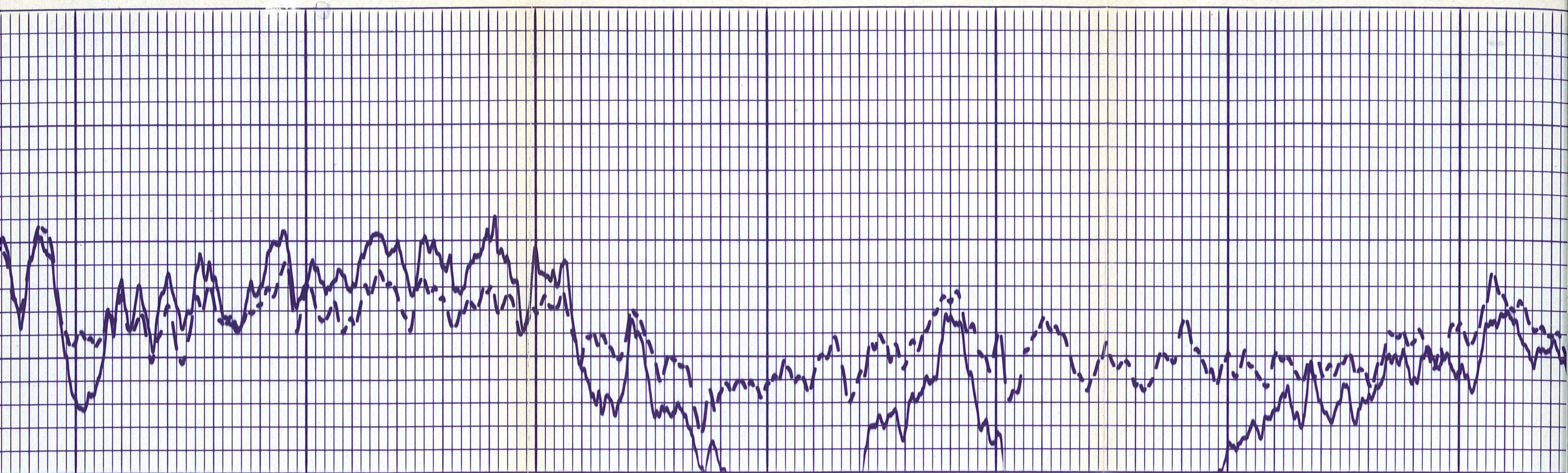
3300

3400

3500

3600



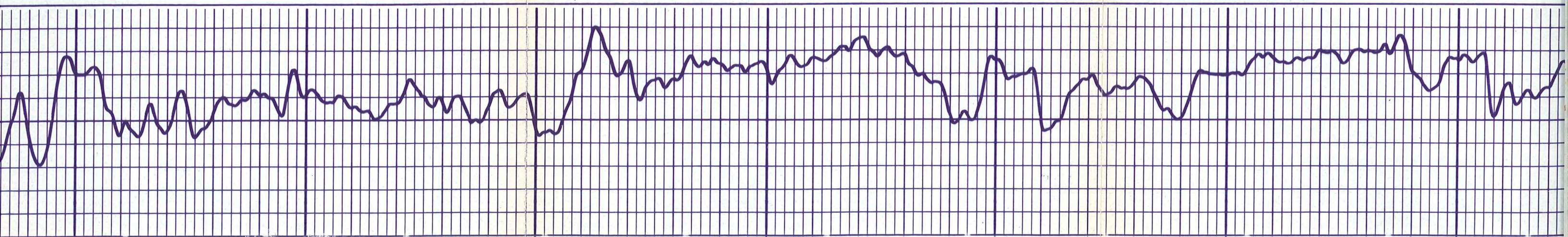


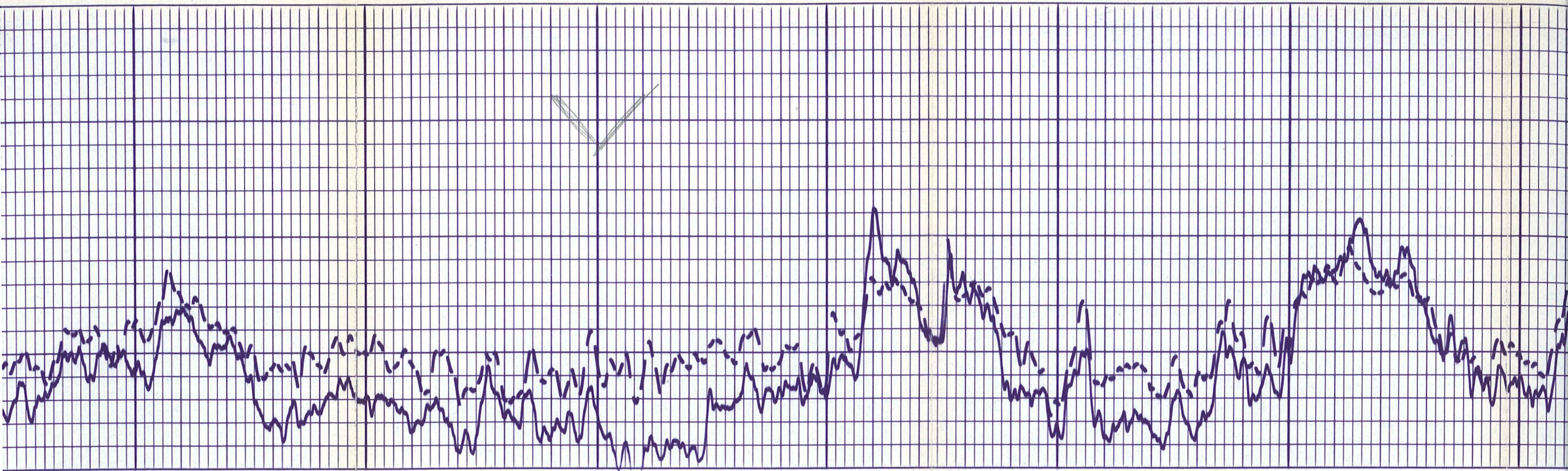
3600

3700

3800

3900





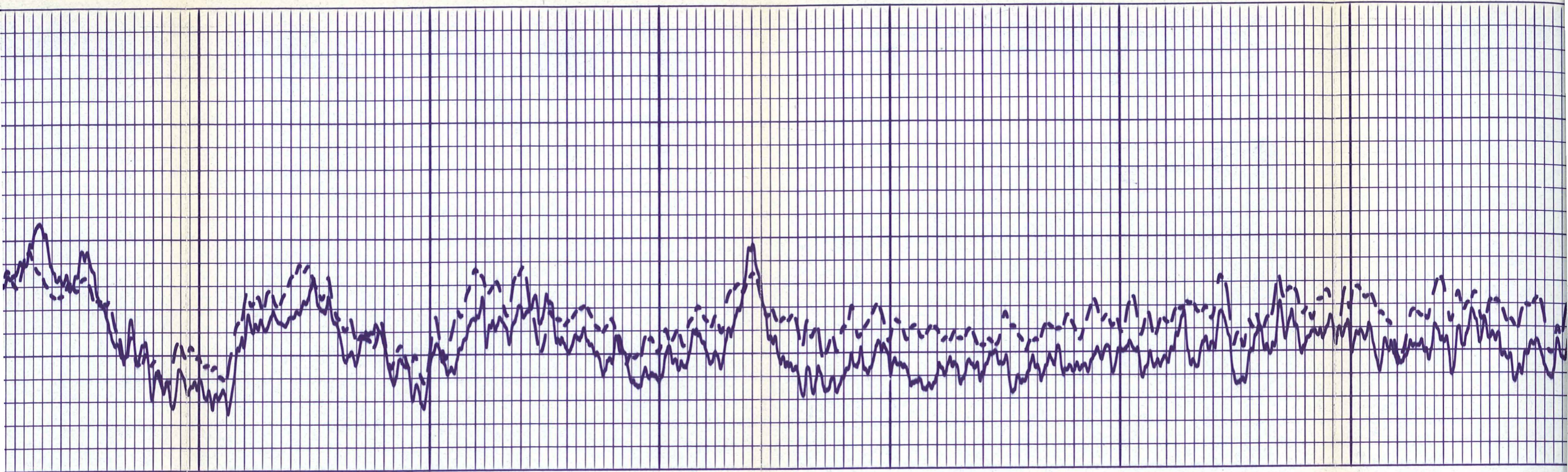
3900

4000

4100

4200

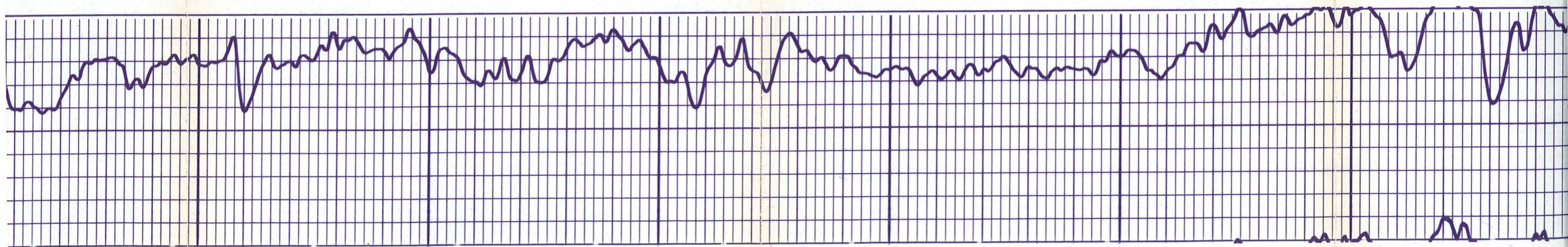


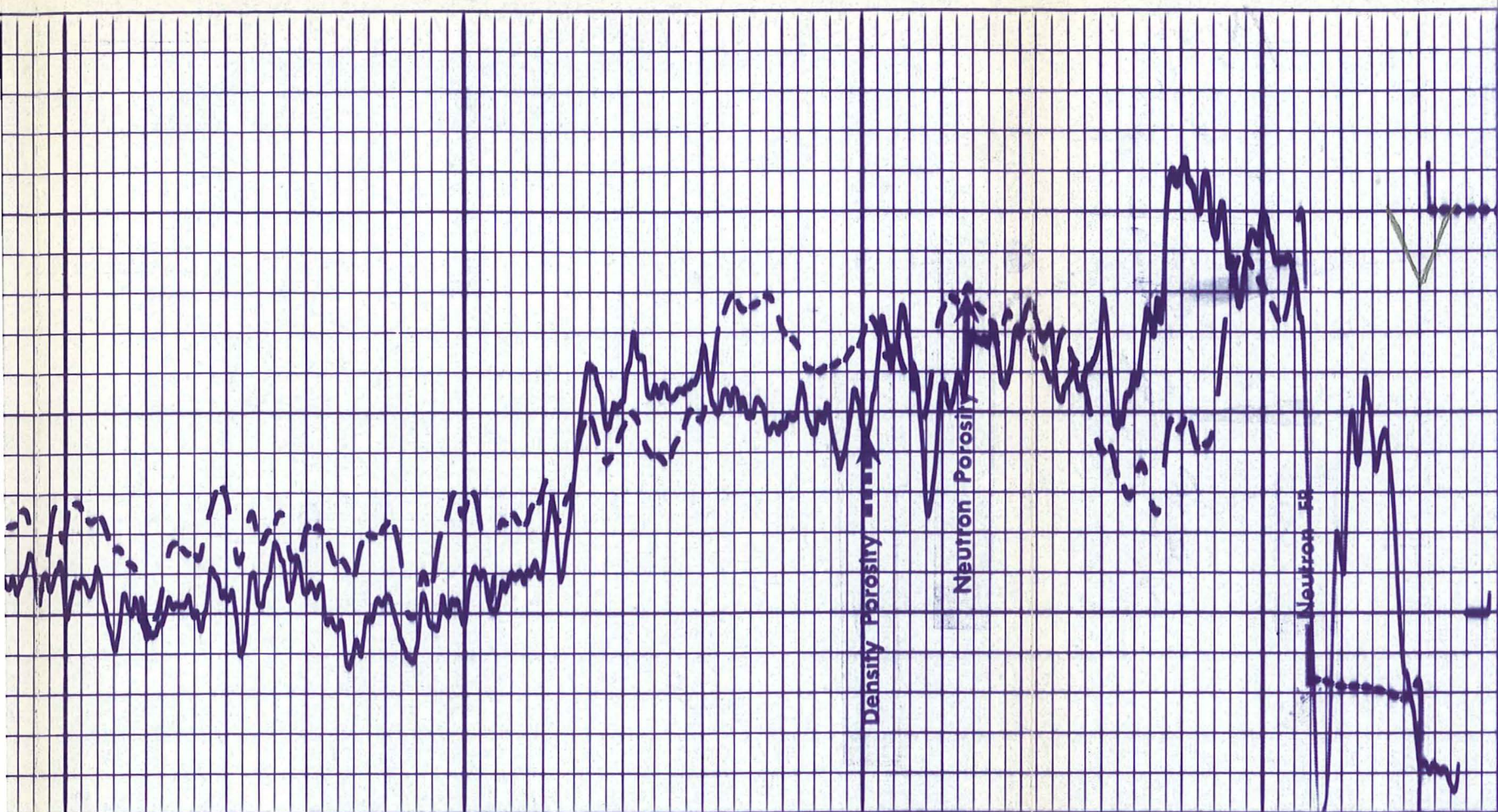


4200

4300

4400

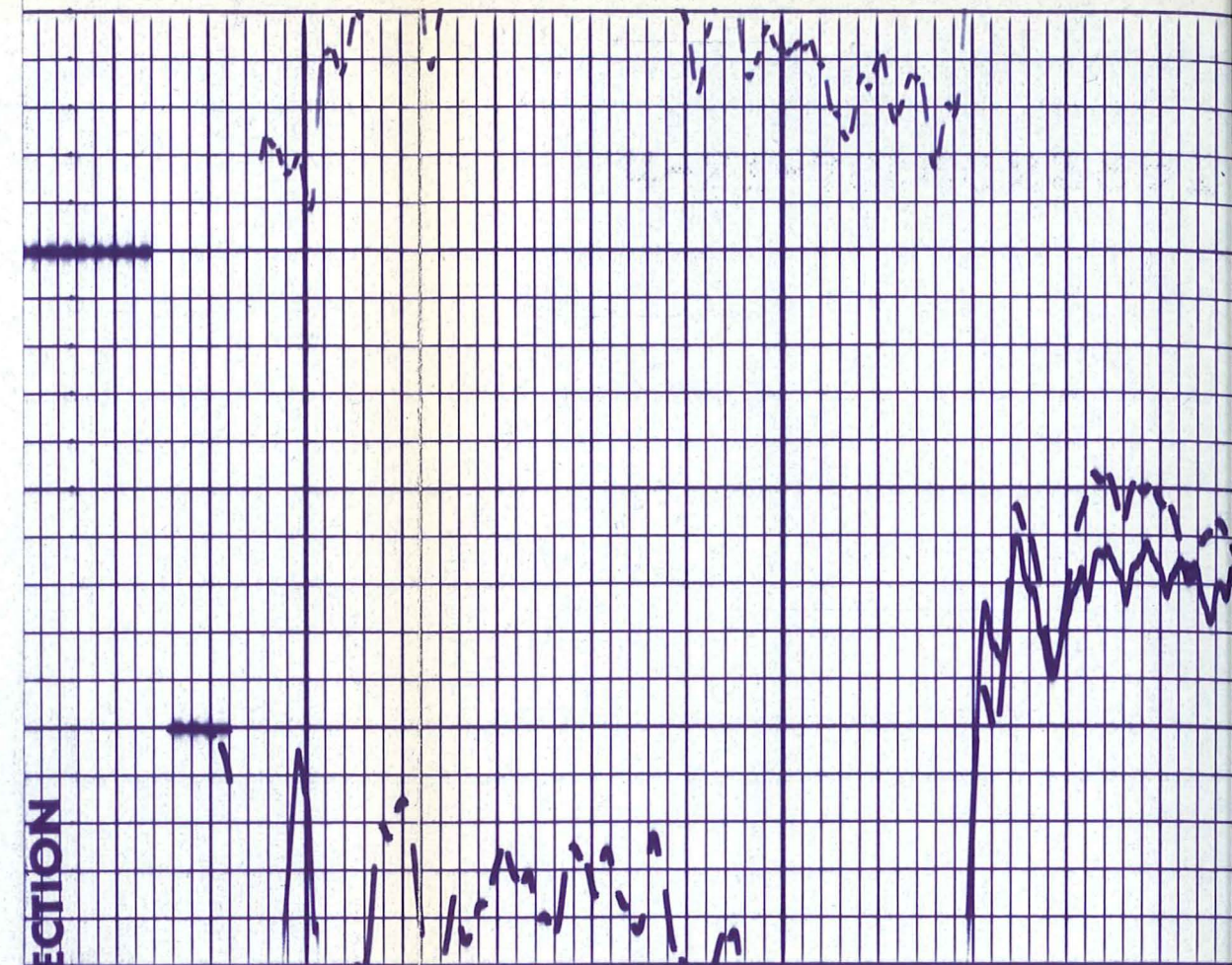
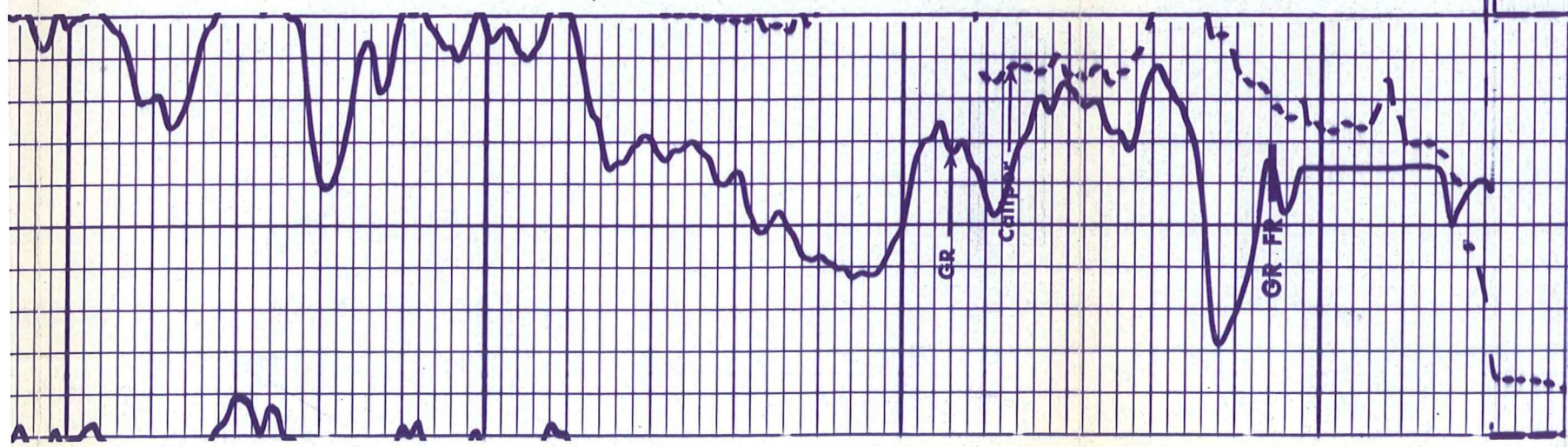




4500

4600

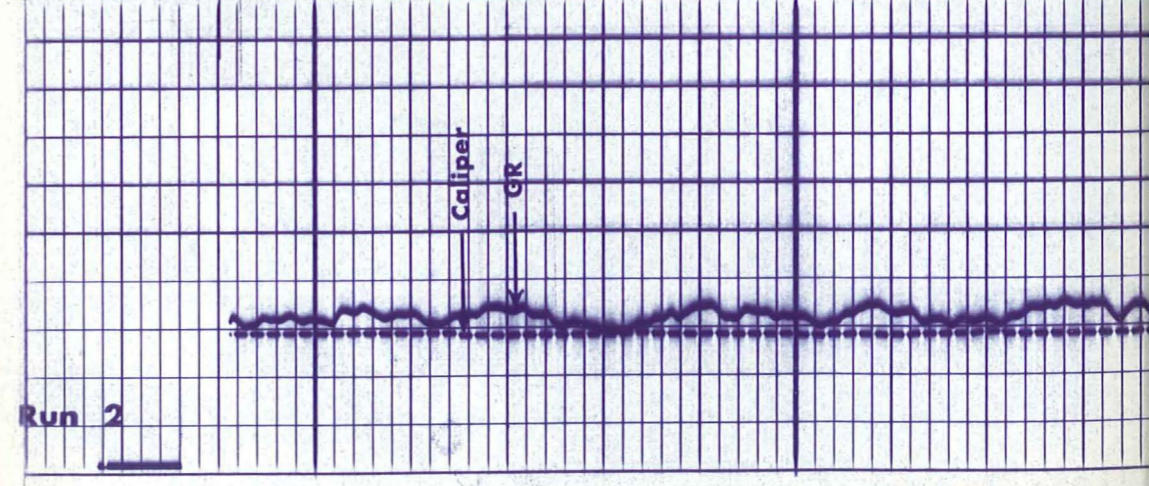
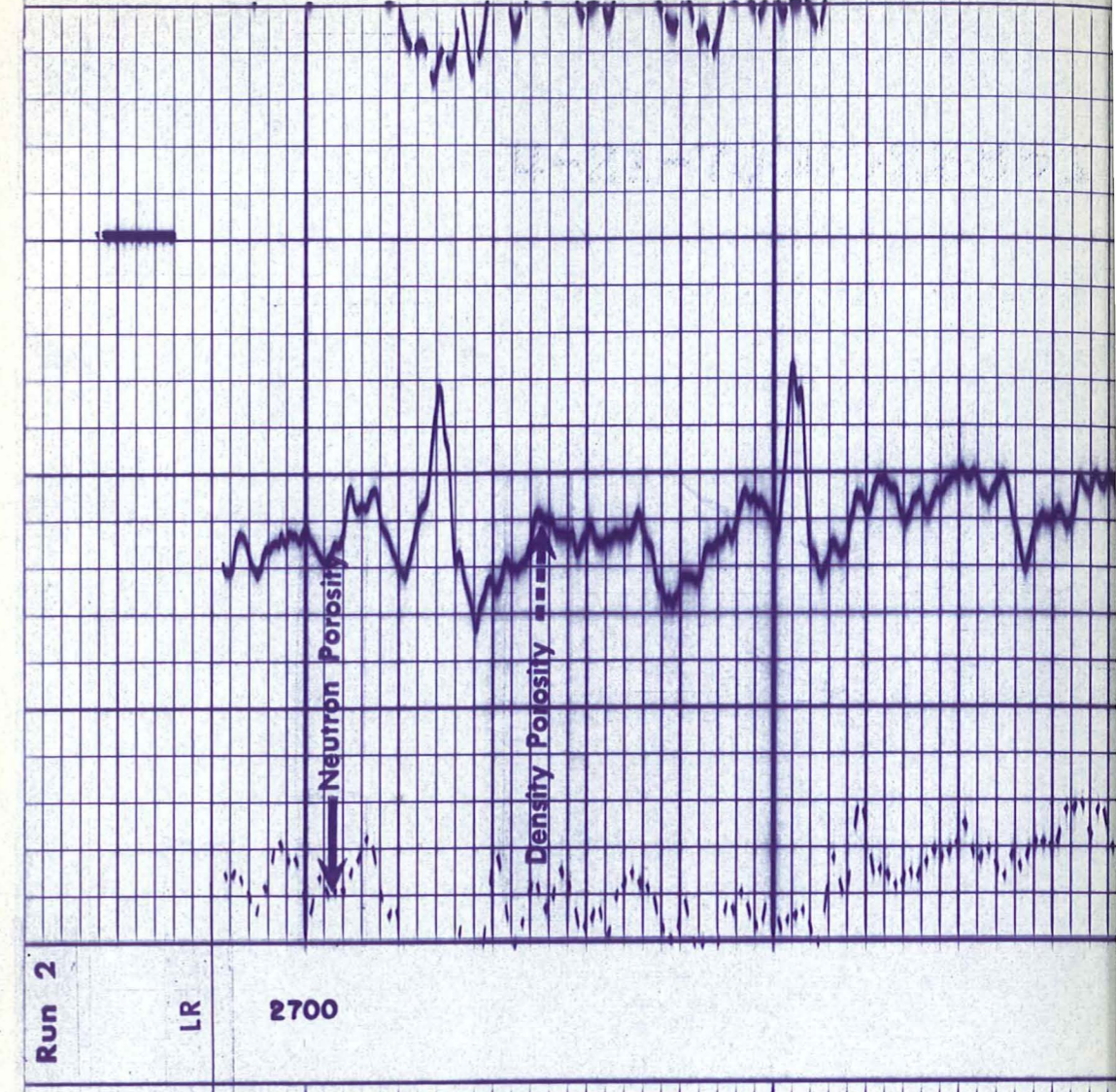
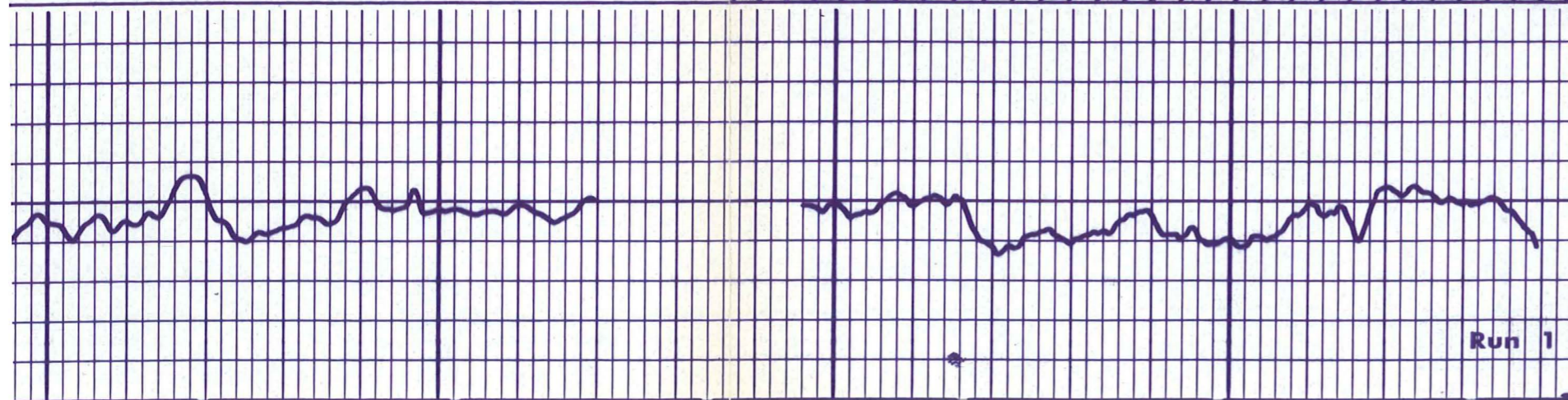
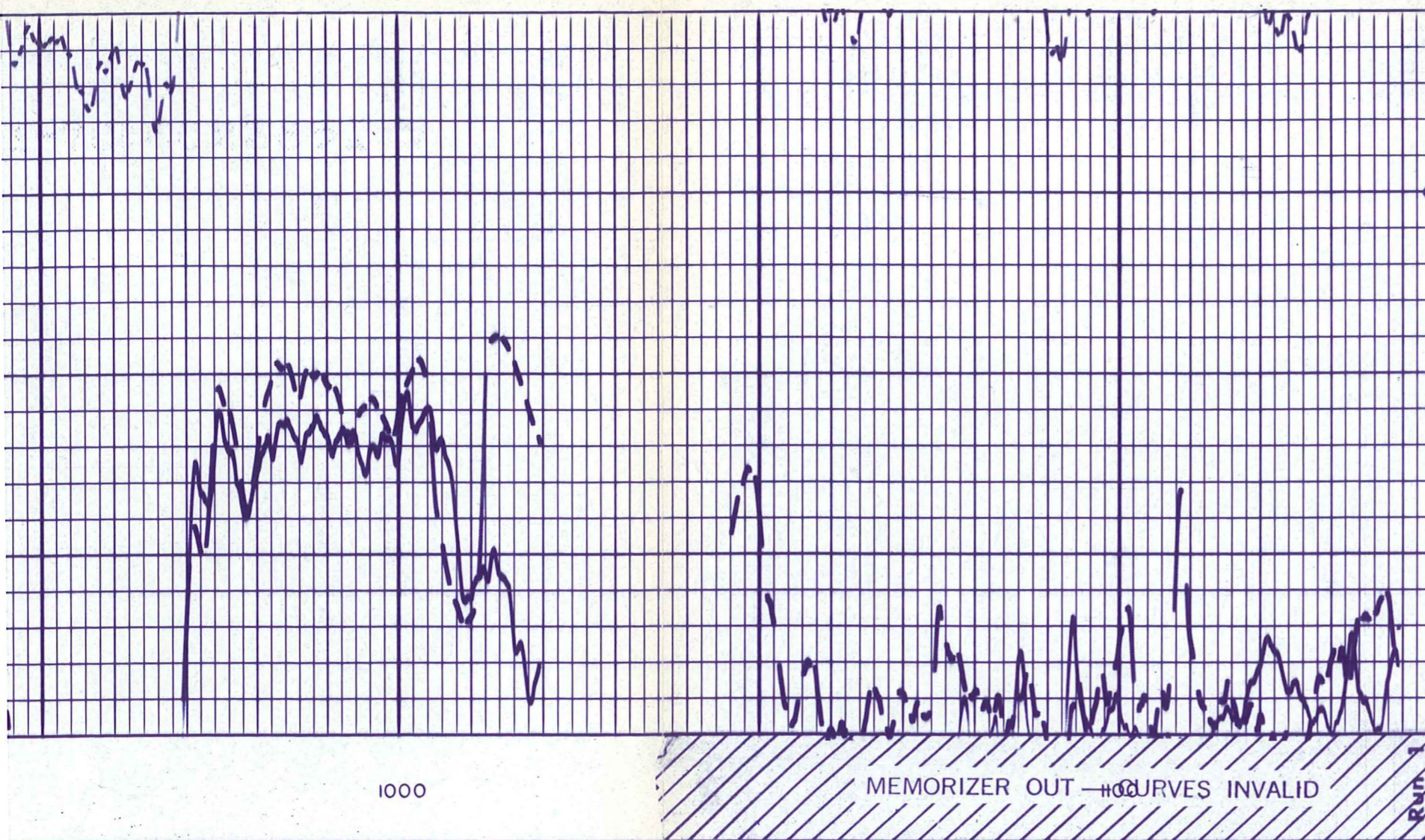
Run 1



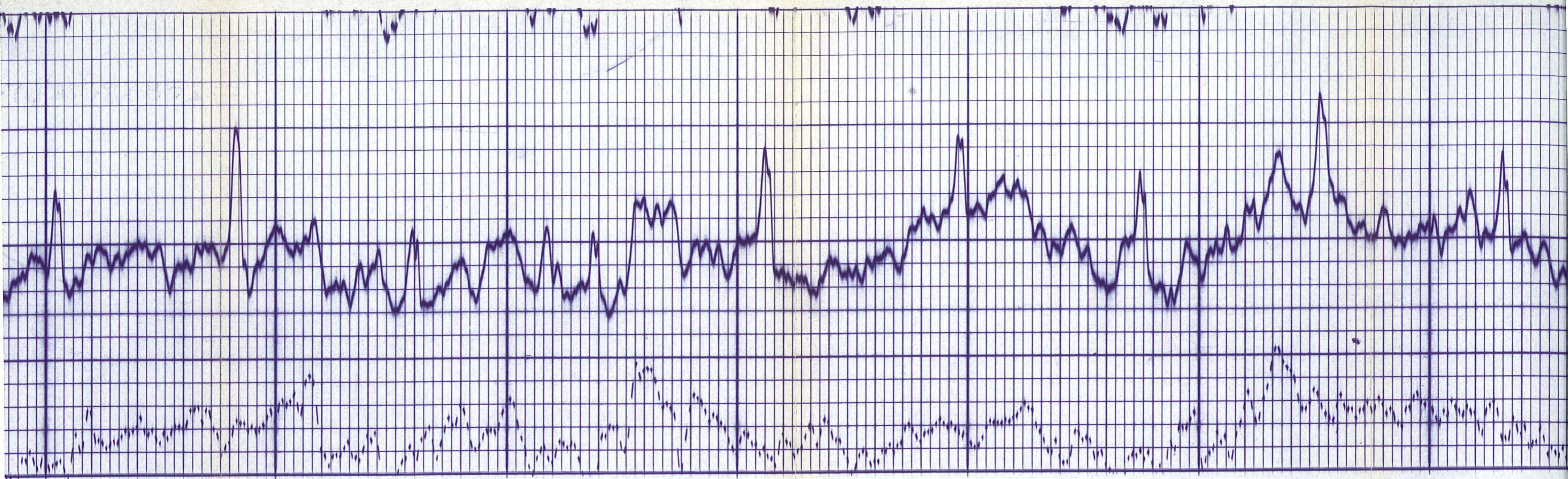
0900

REPEAT SECTION

Run 1



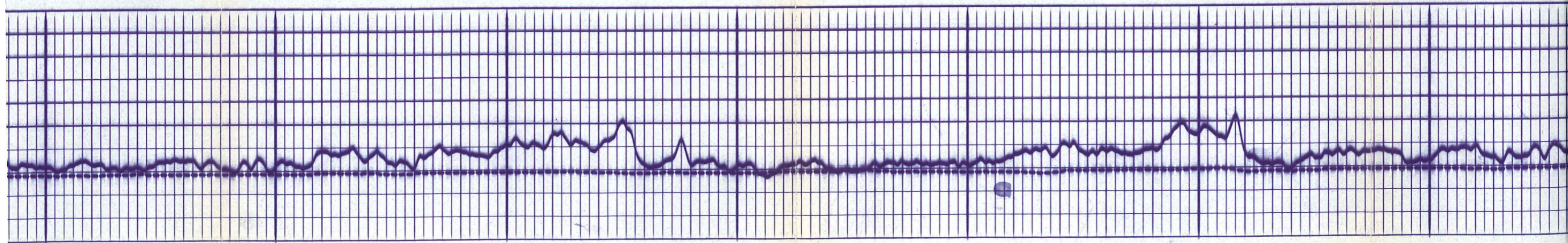


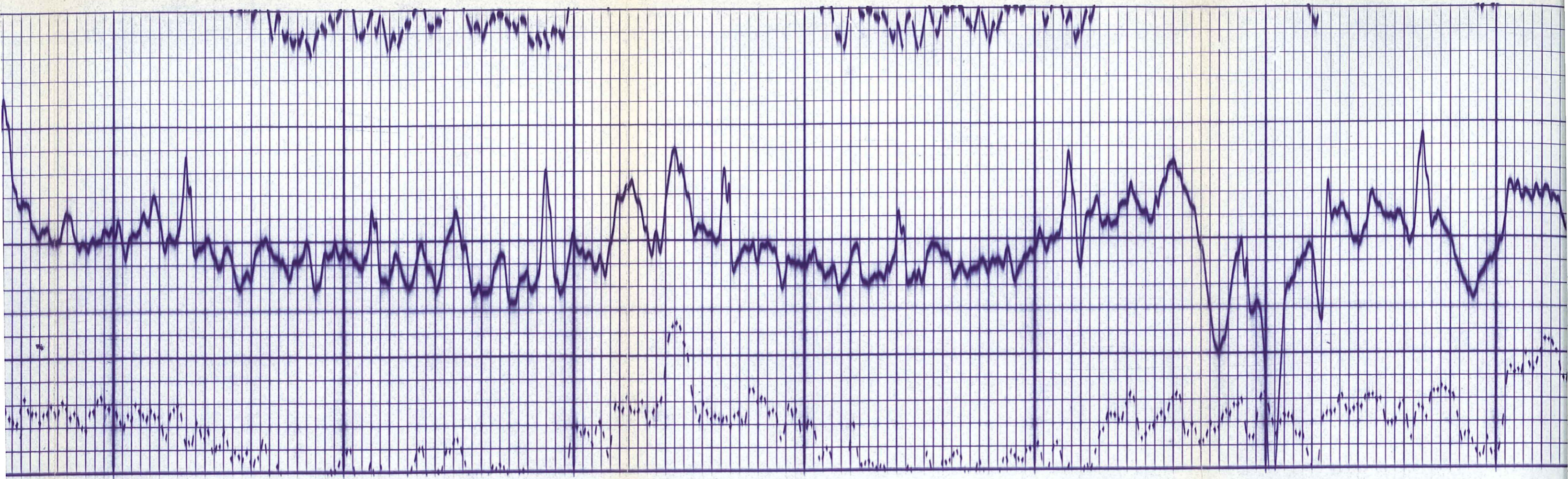


2800

2900

3000

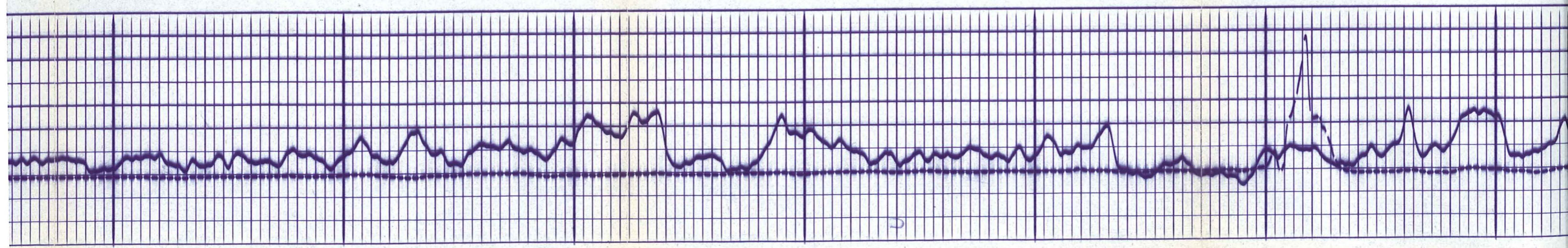


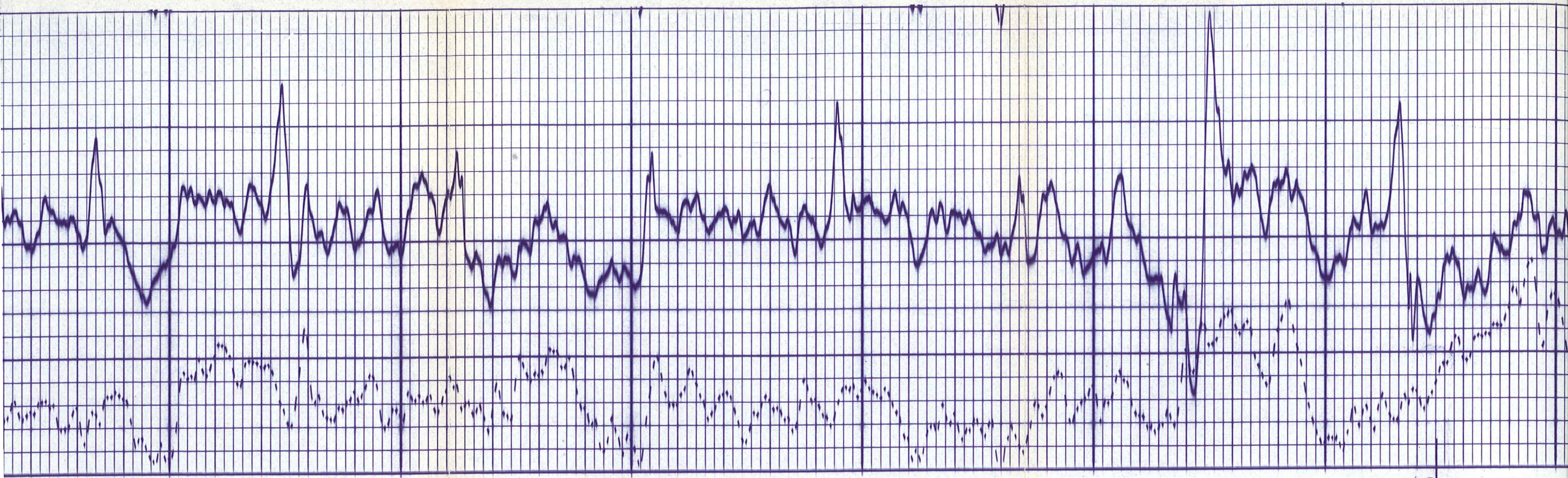


3100

3200

3300



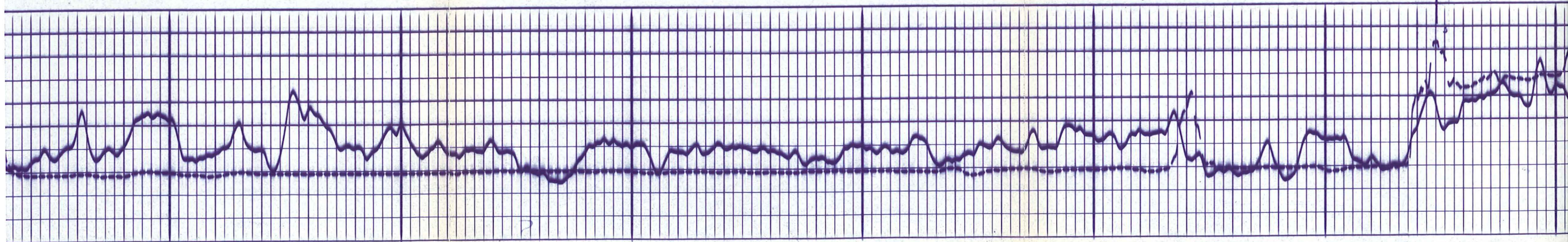


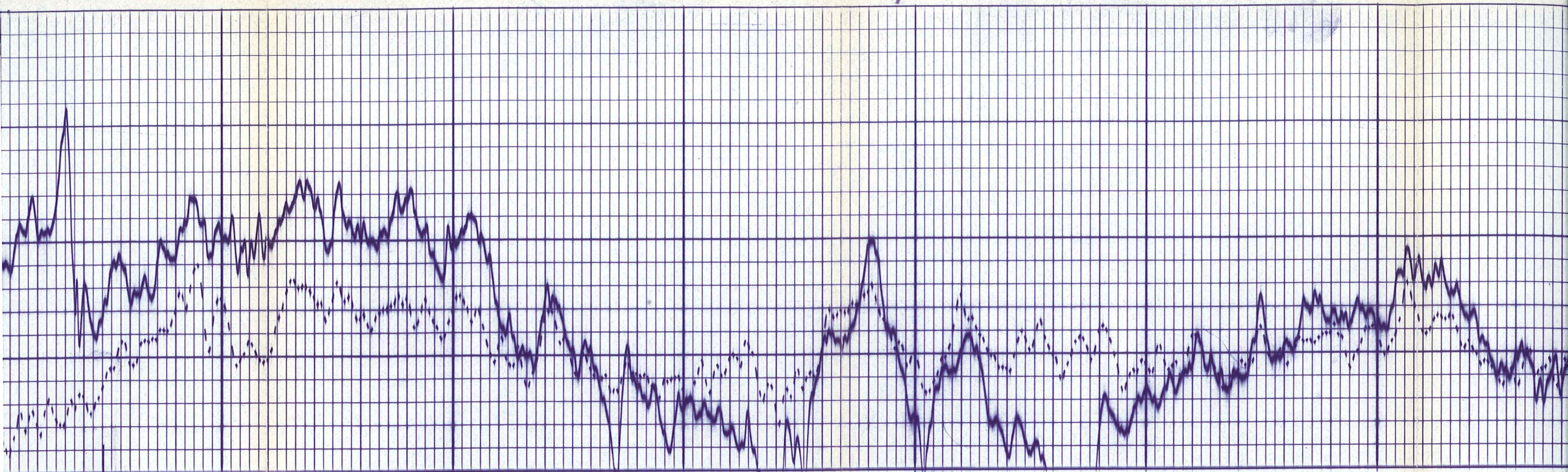
3400

3500

3600

Casing



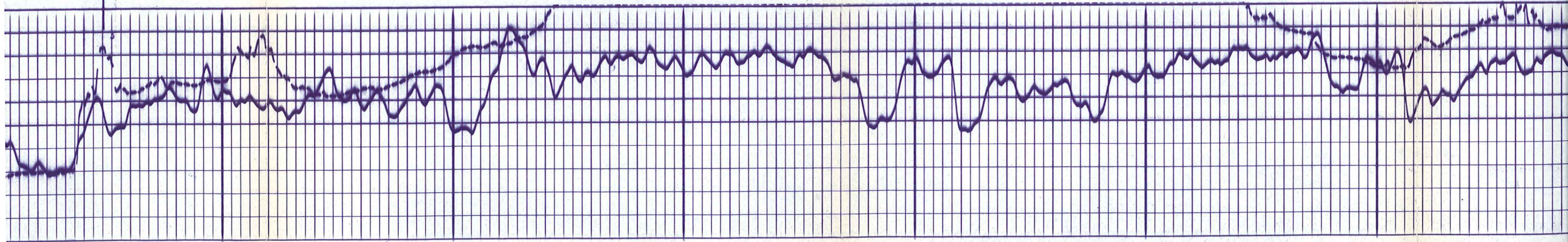


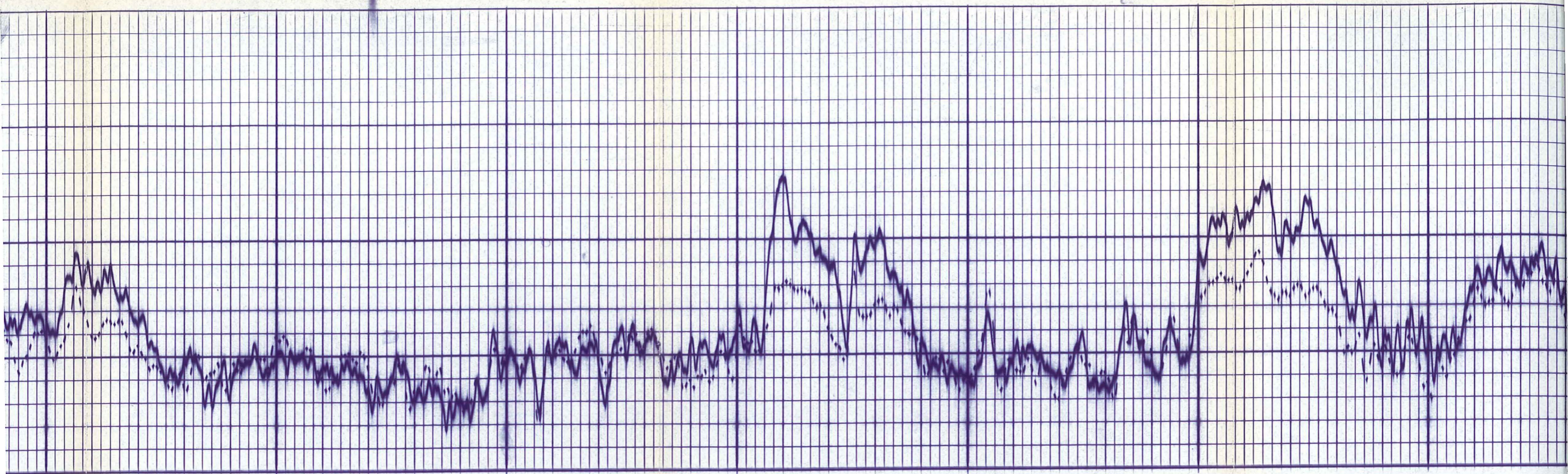
Casing

3700

3800

3900



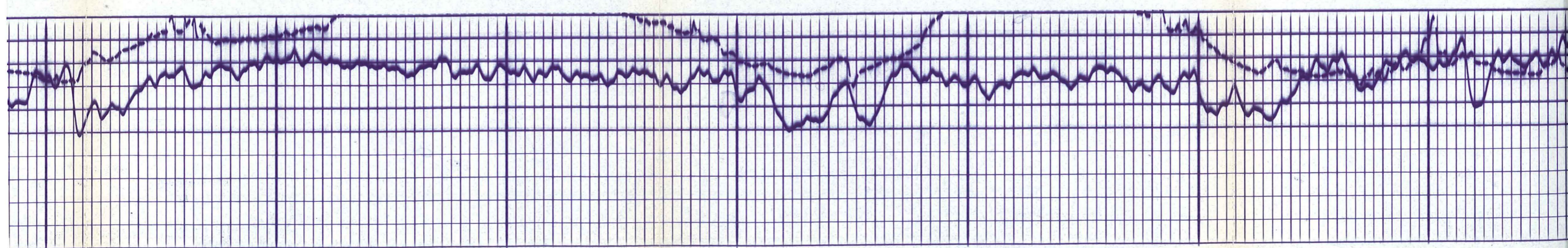


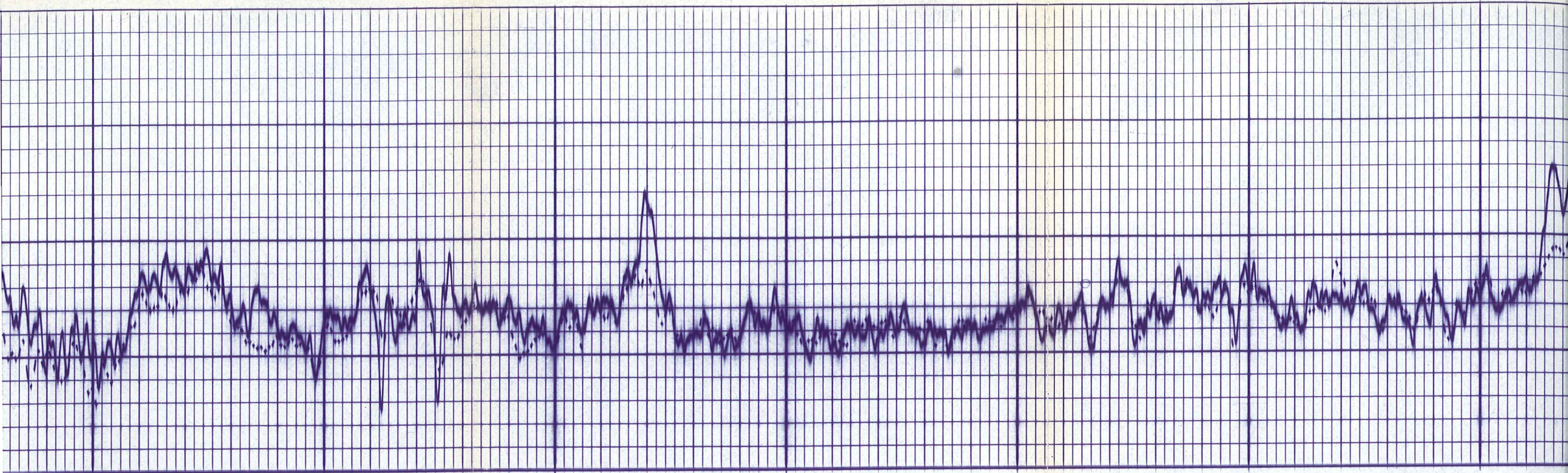
3900

4000

4100

4200



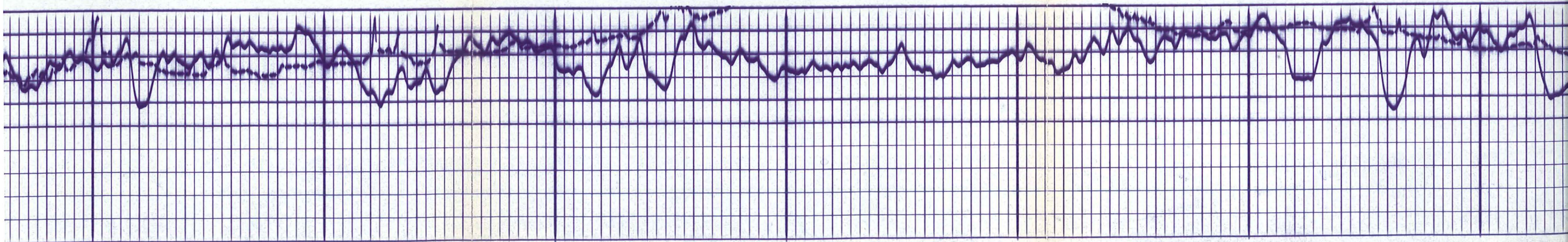


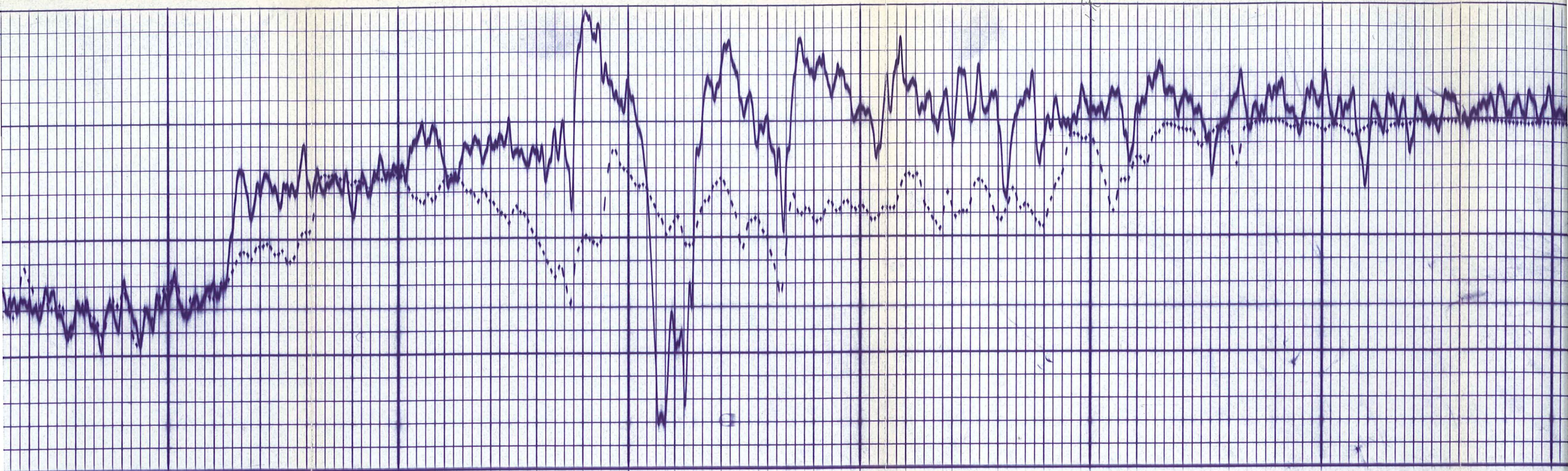
4200

4300

4400

4500



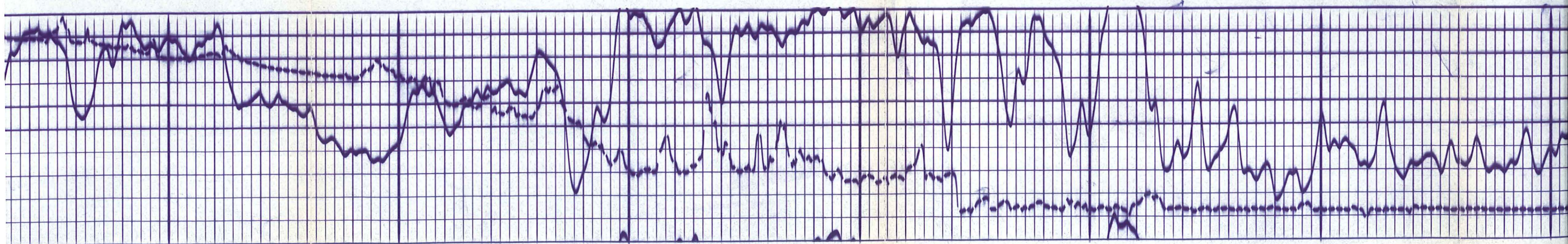


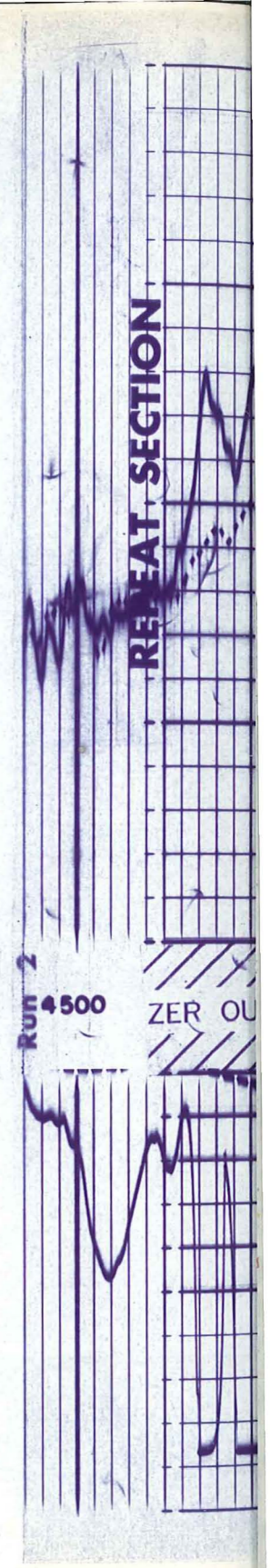
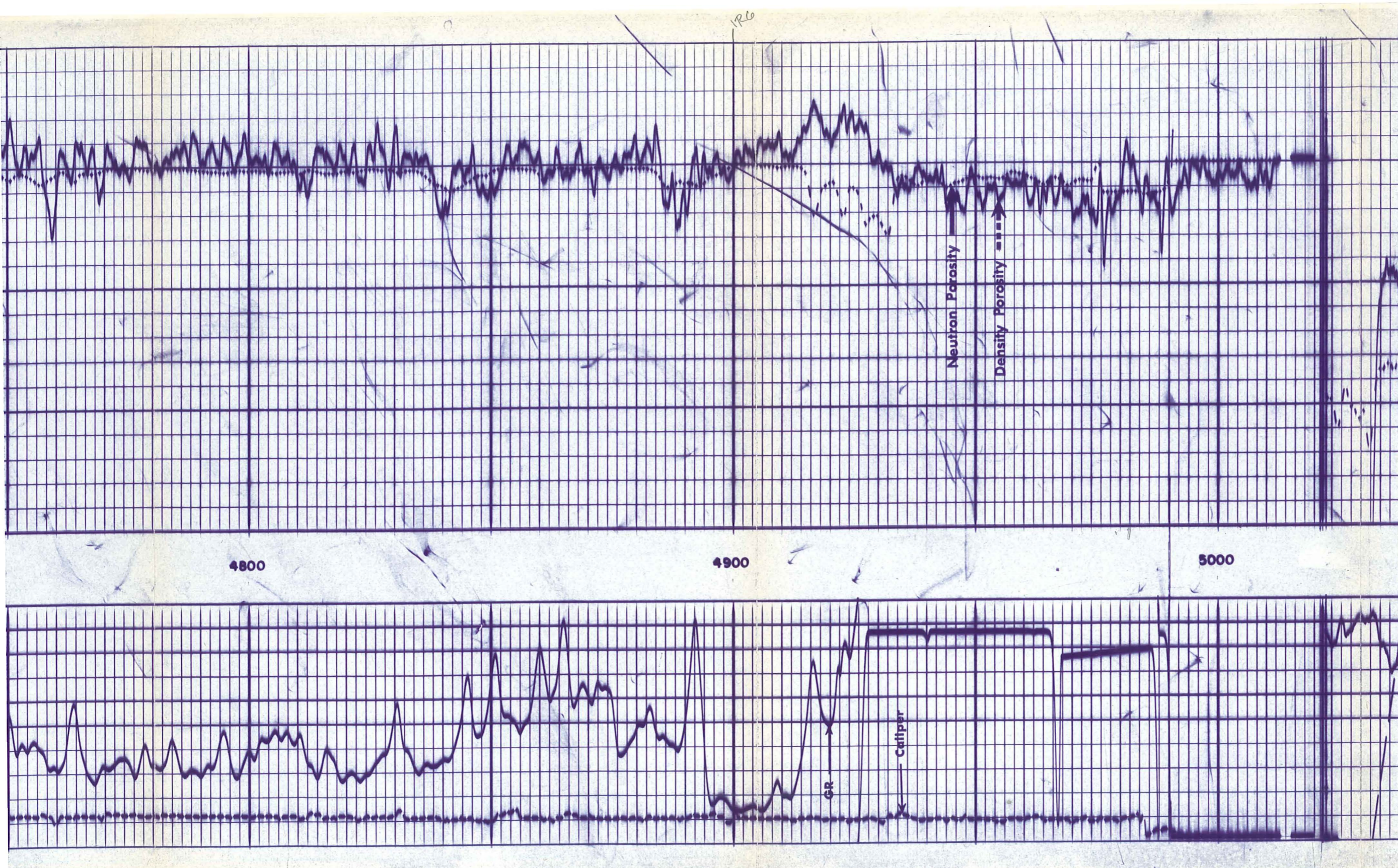
4500

4600

4700

4800







REPEAT SECTION

RUN 2

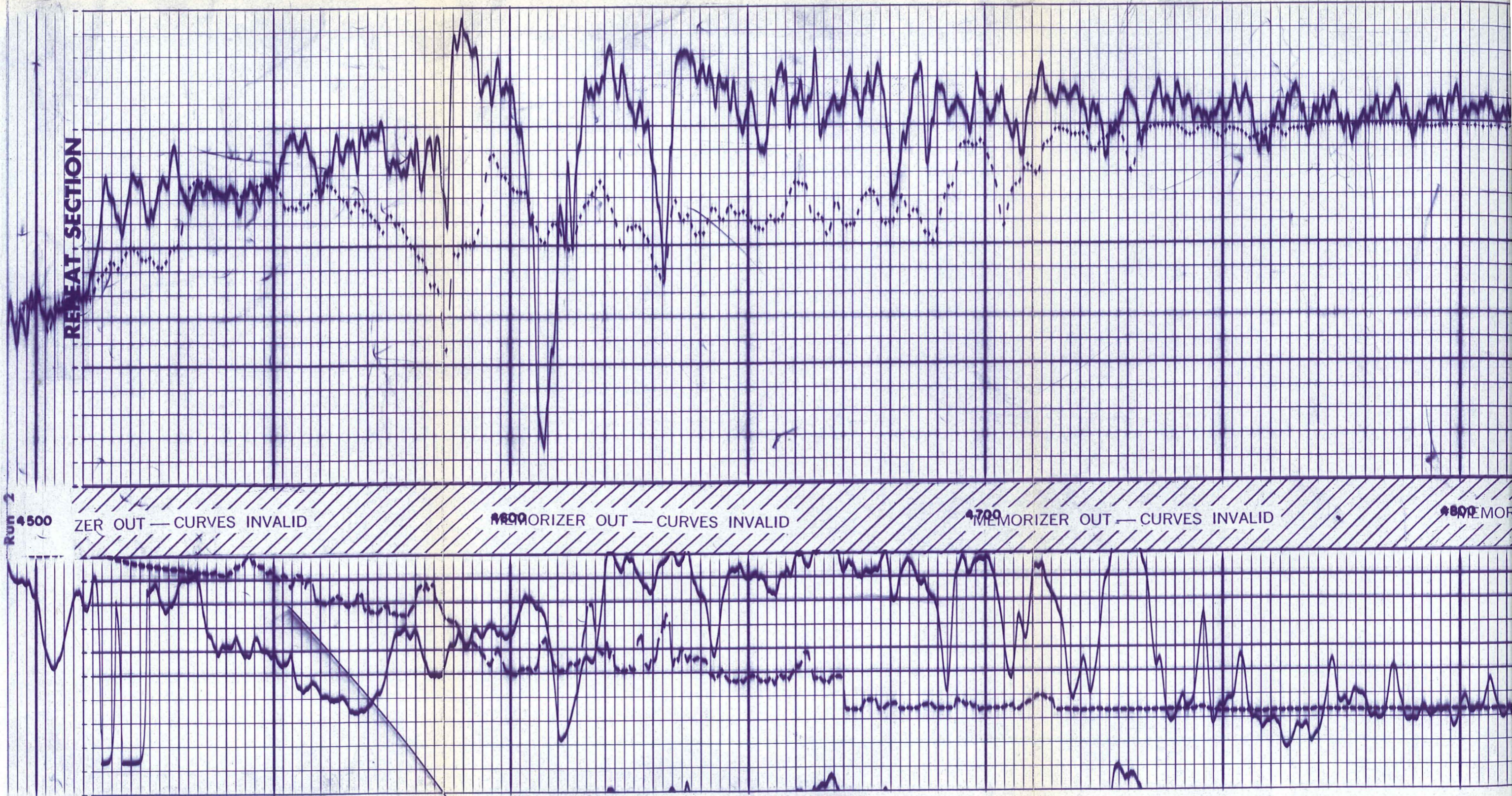
4500

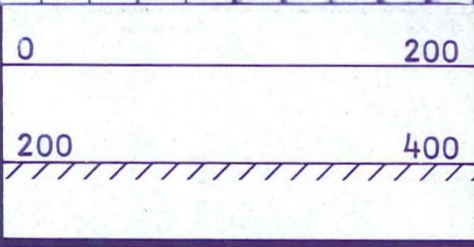
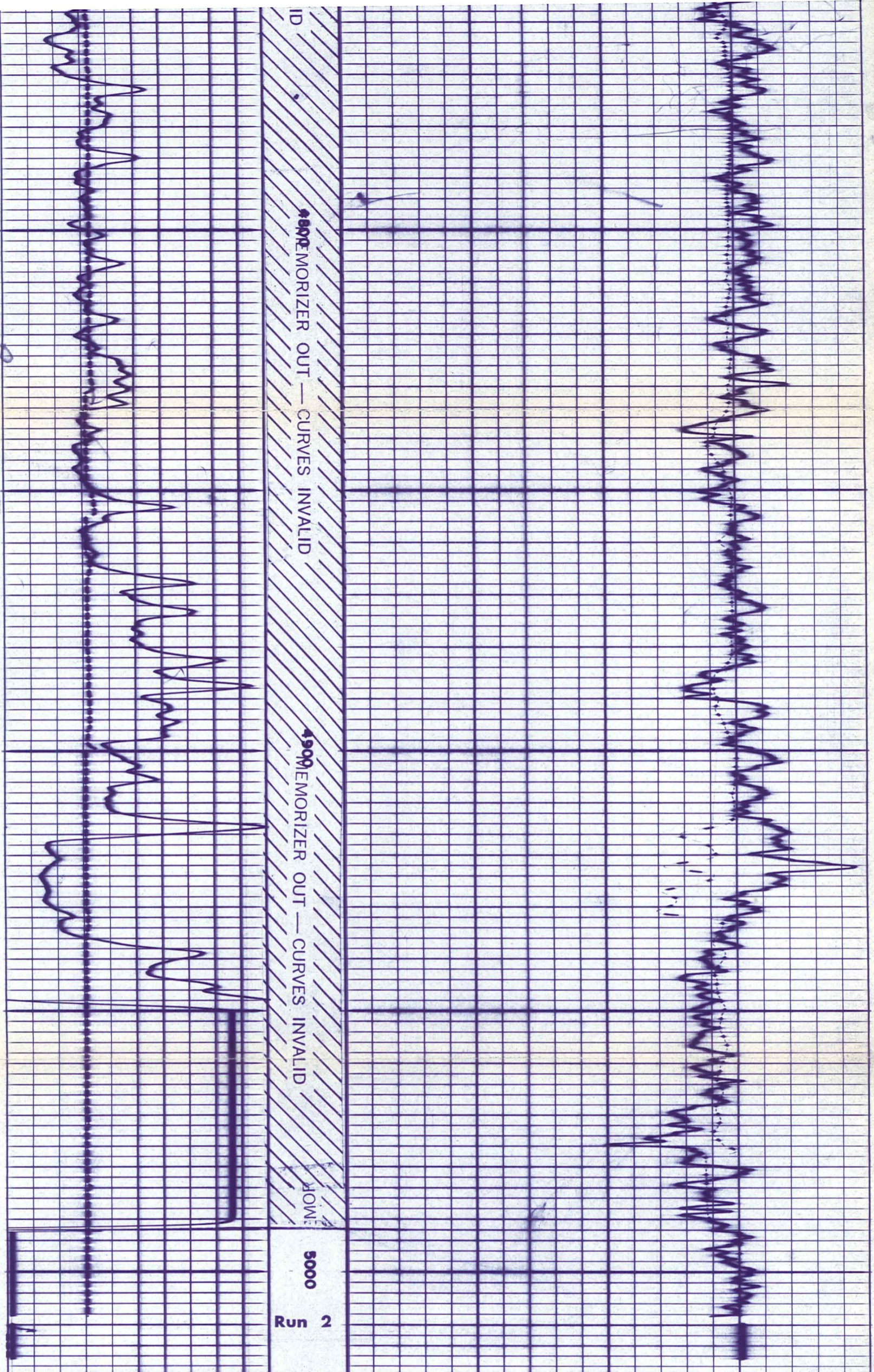
ZER OUT — CURVES INVALID

MEMORIZER OUT — CURVES INVALID

MEMORIZER OUT — CURVES INVALID

MEMOR





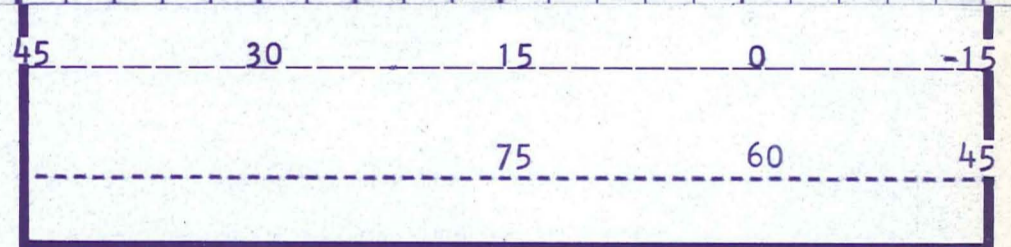
**GAMMA RAY**  
API UNITS



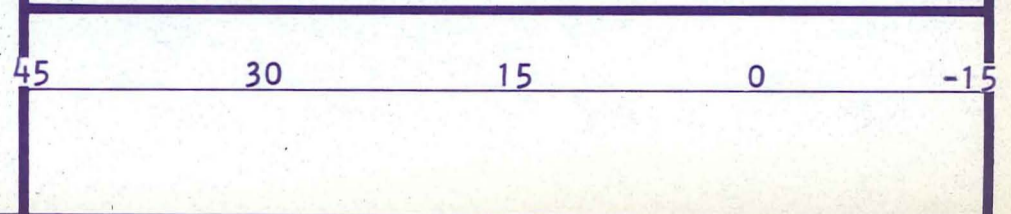
**CALIPER**  
HOLE DIAM. IN INCHES

ID  
MORORIZER OUT - CURVES INVALID  
MORORIZER OUT - CURVES INVALID  
JOINT  
5000  
Run 2

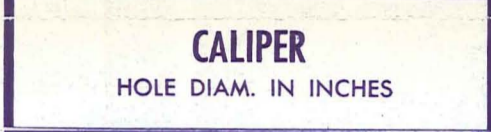
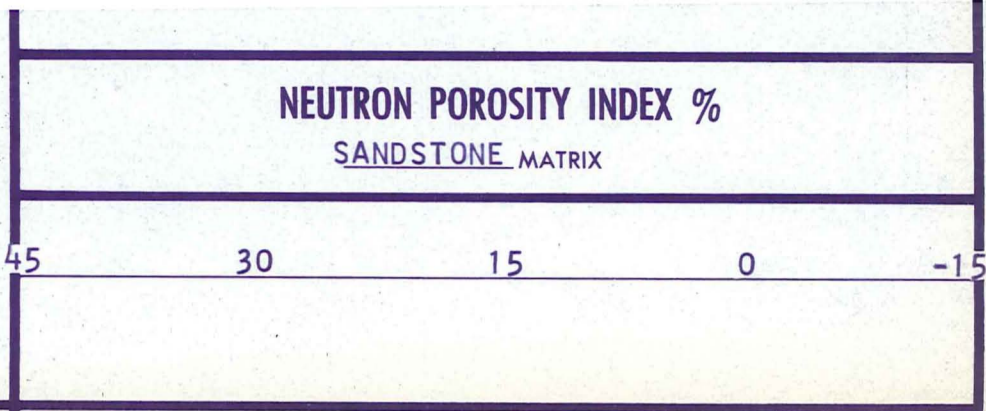
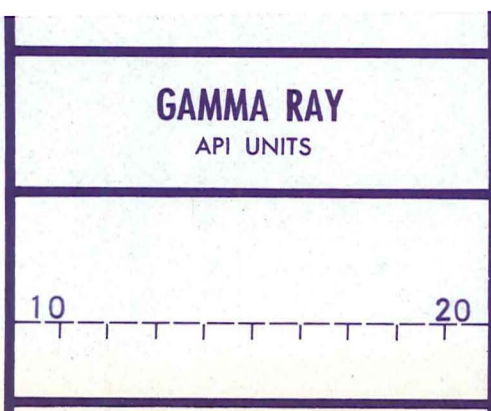
DEPTHS



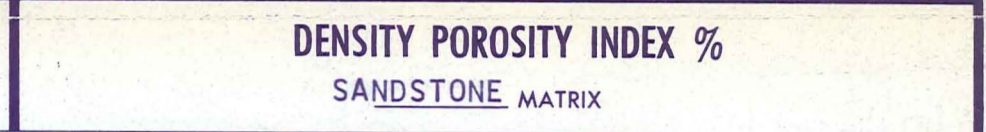
**NEUTRON POROSITY INDEX %**  
SANDSTONE MATRIX



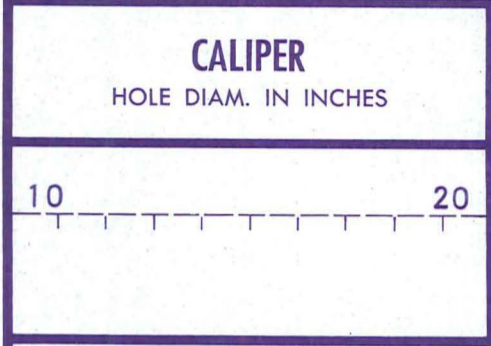
**DENSITY POROSITY INDEX %**  
SANDSTONE MATRIX



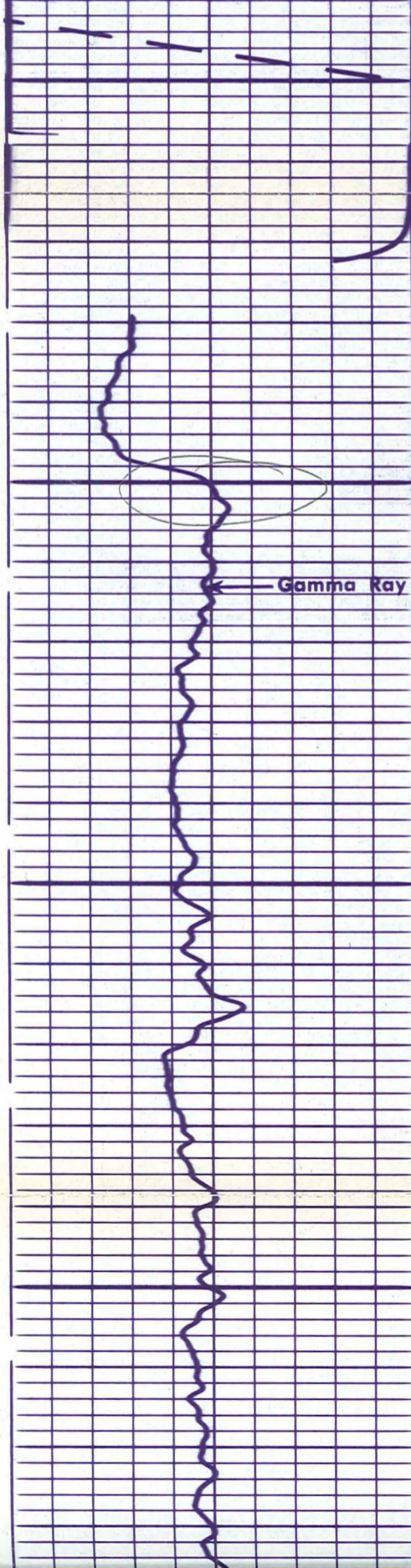
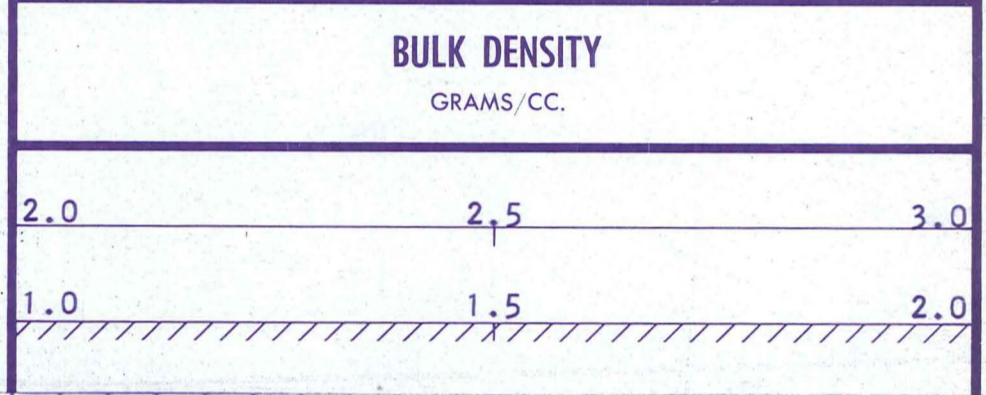
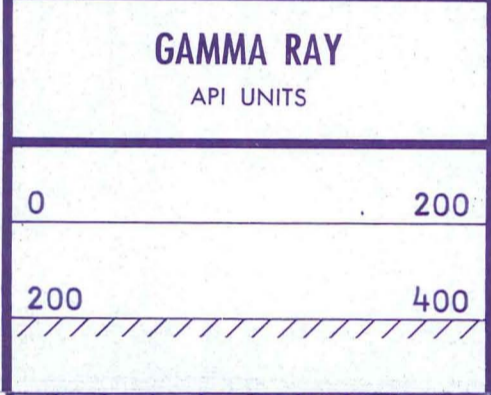
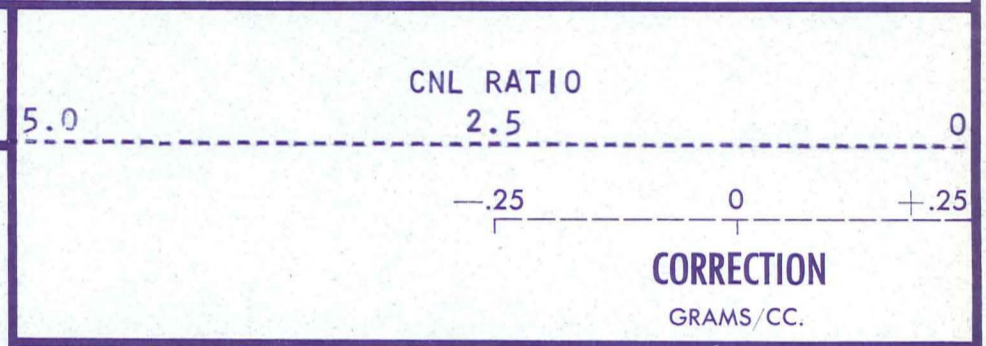
DEPTHS



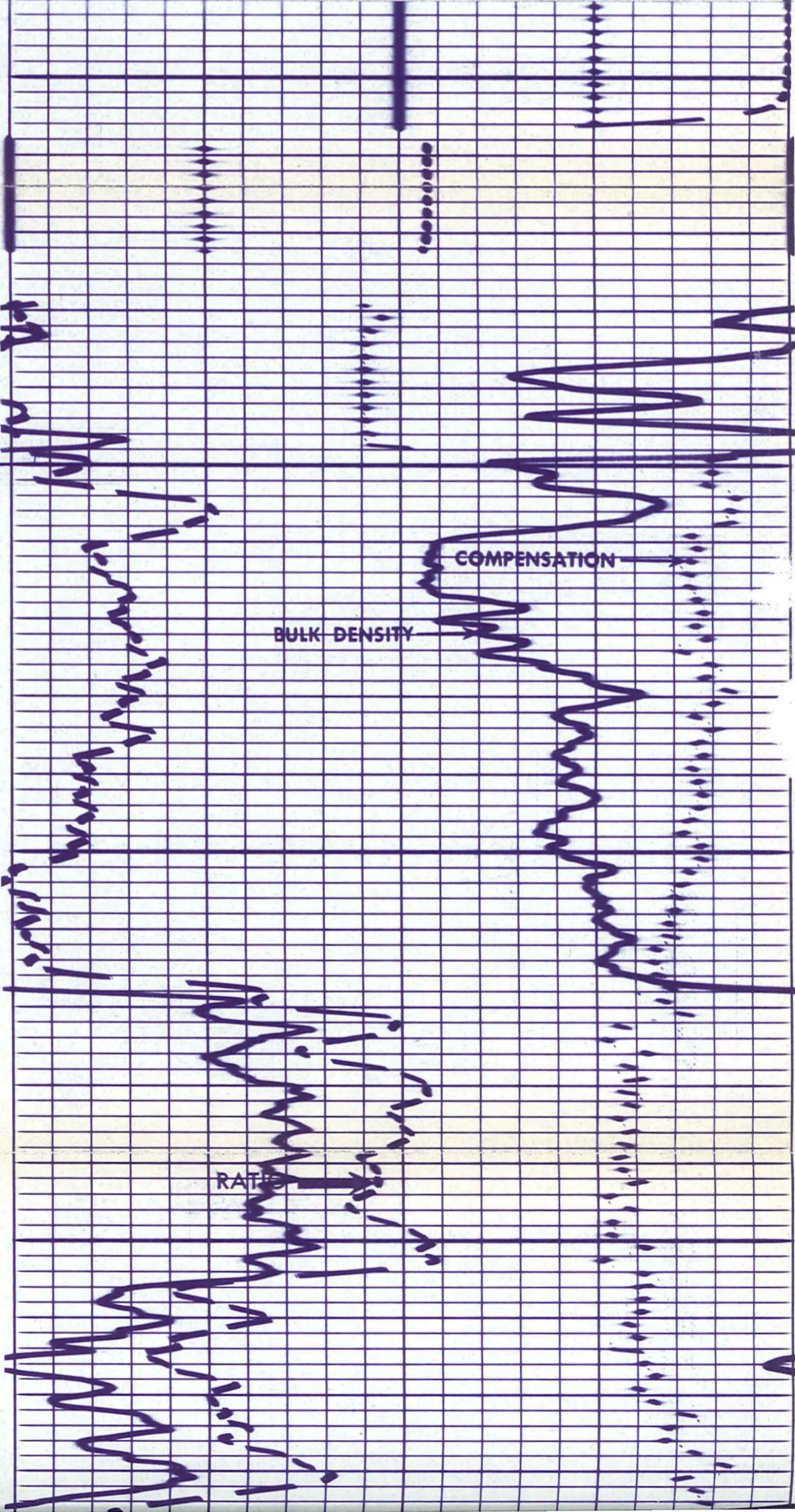
**DETAIL LOG**  
" = 100'

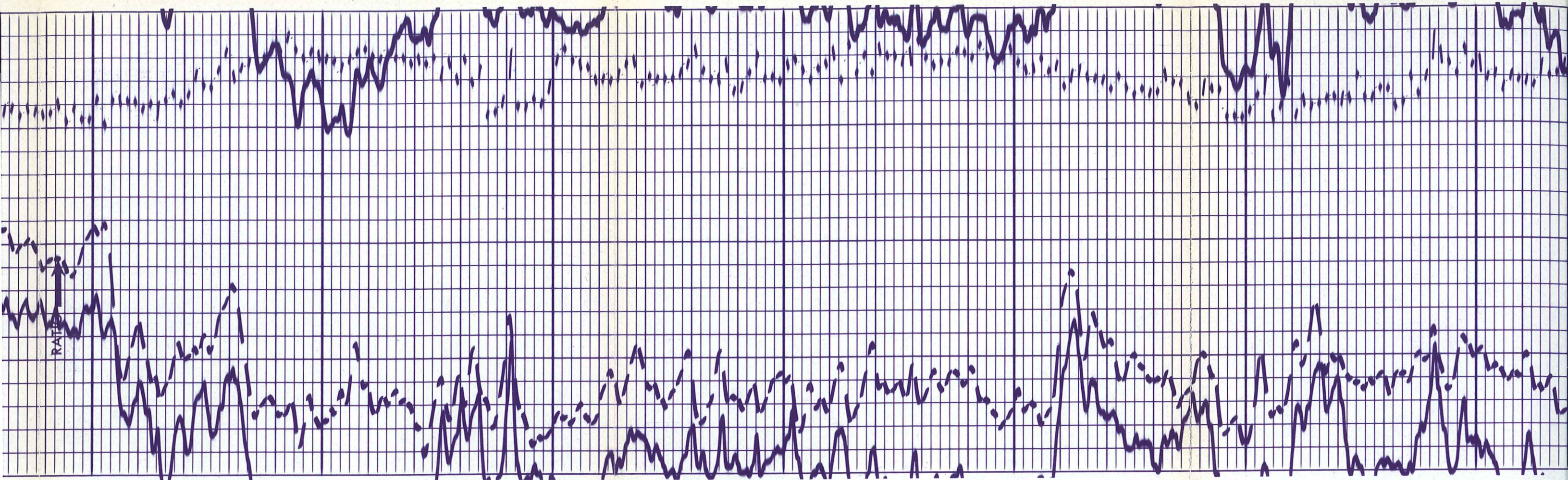


DEPTHS



Run 1  
Casing  
1000



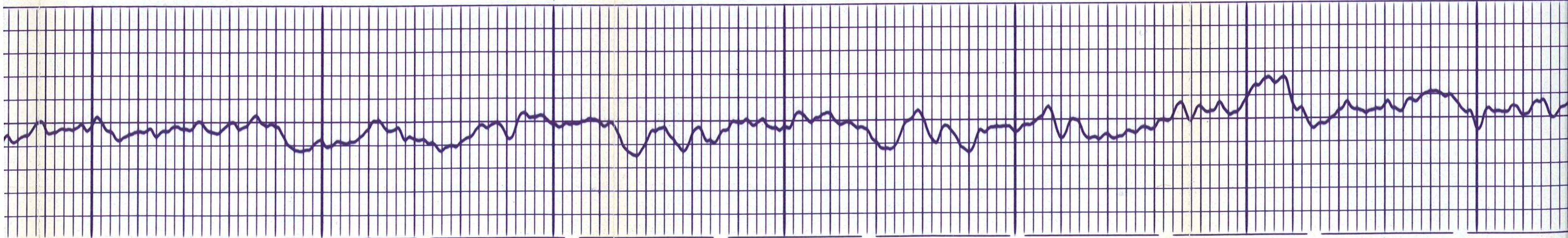


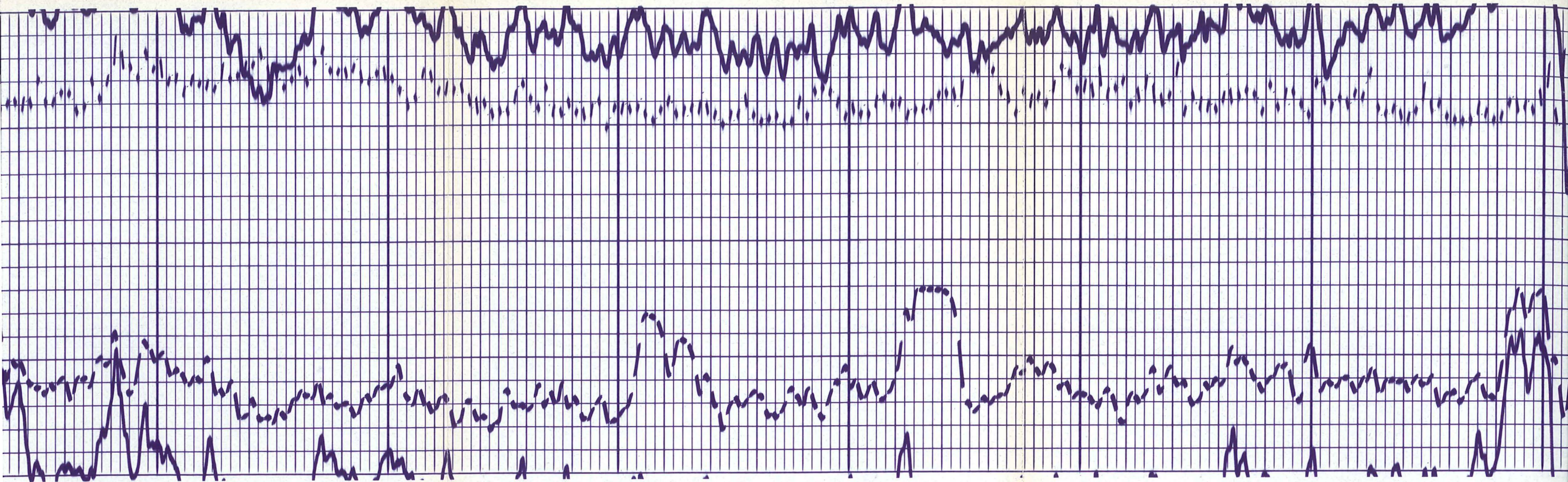
1000

1100

1200

1300





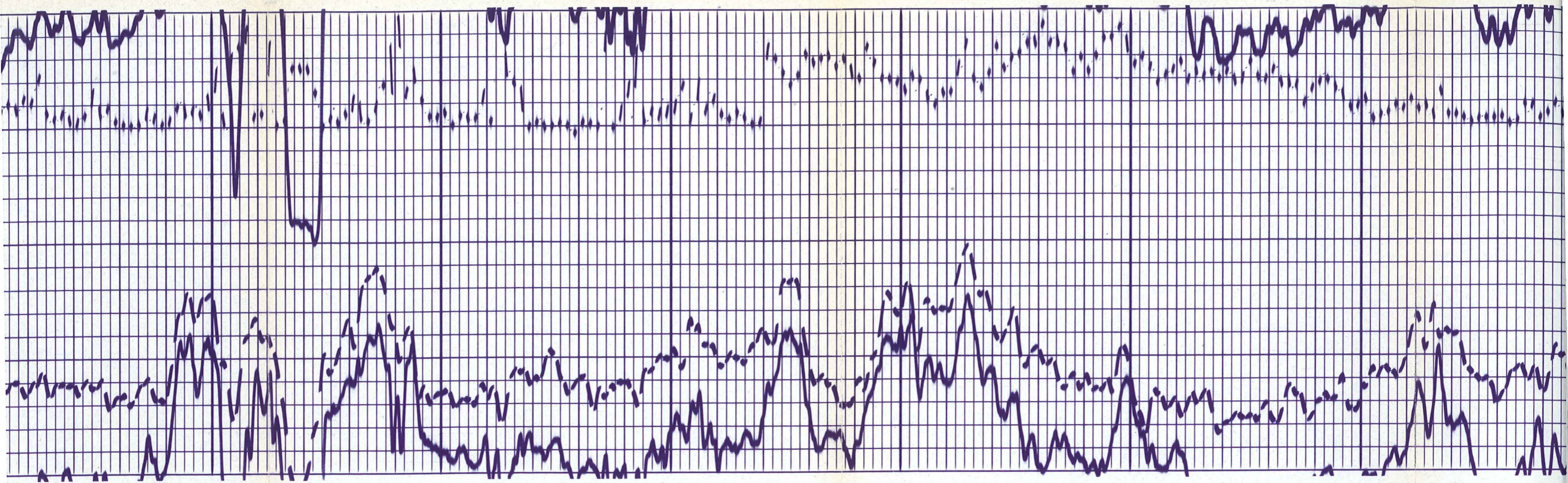
1300

1400

1500

1600

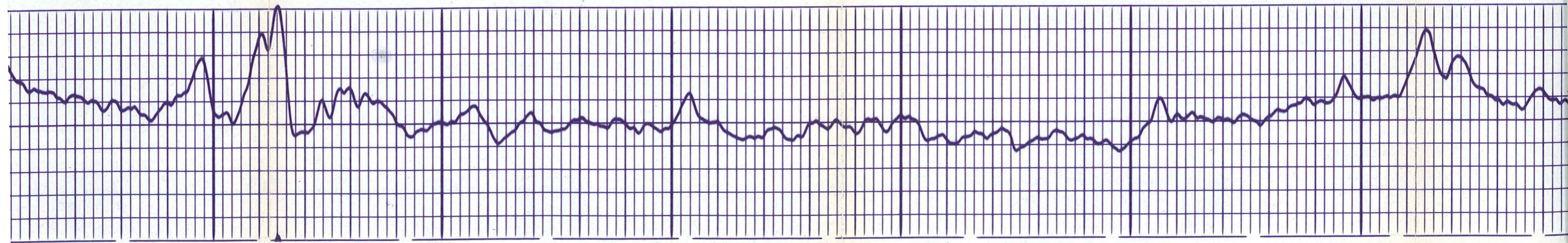


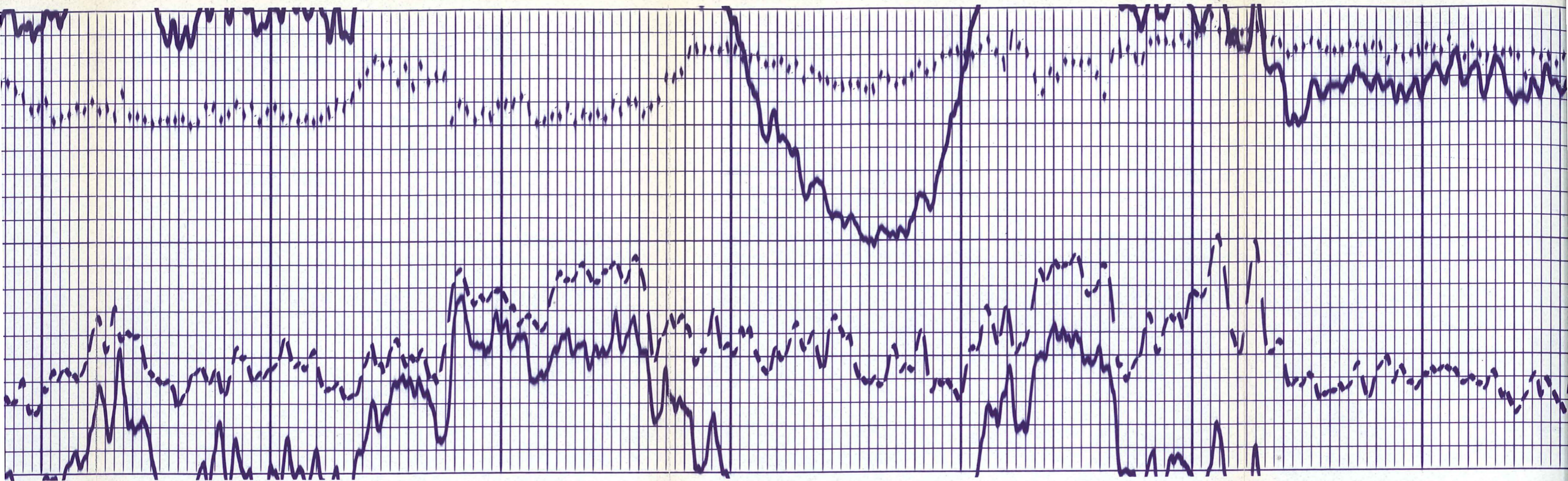


1600

1700

1800

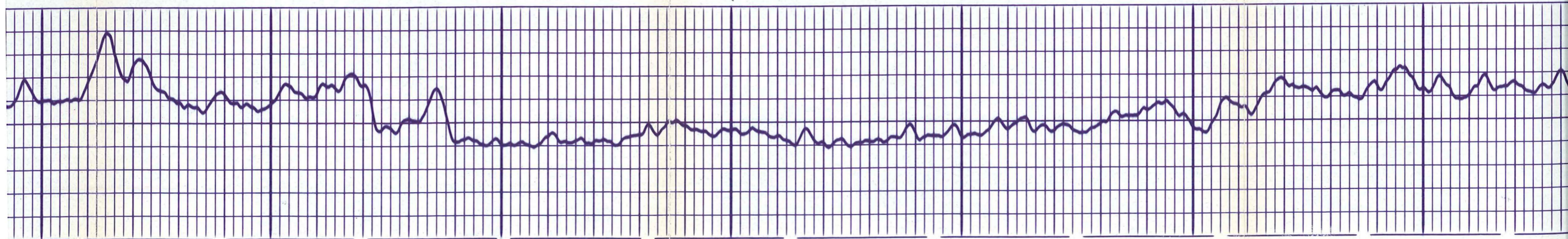


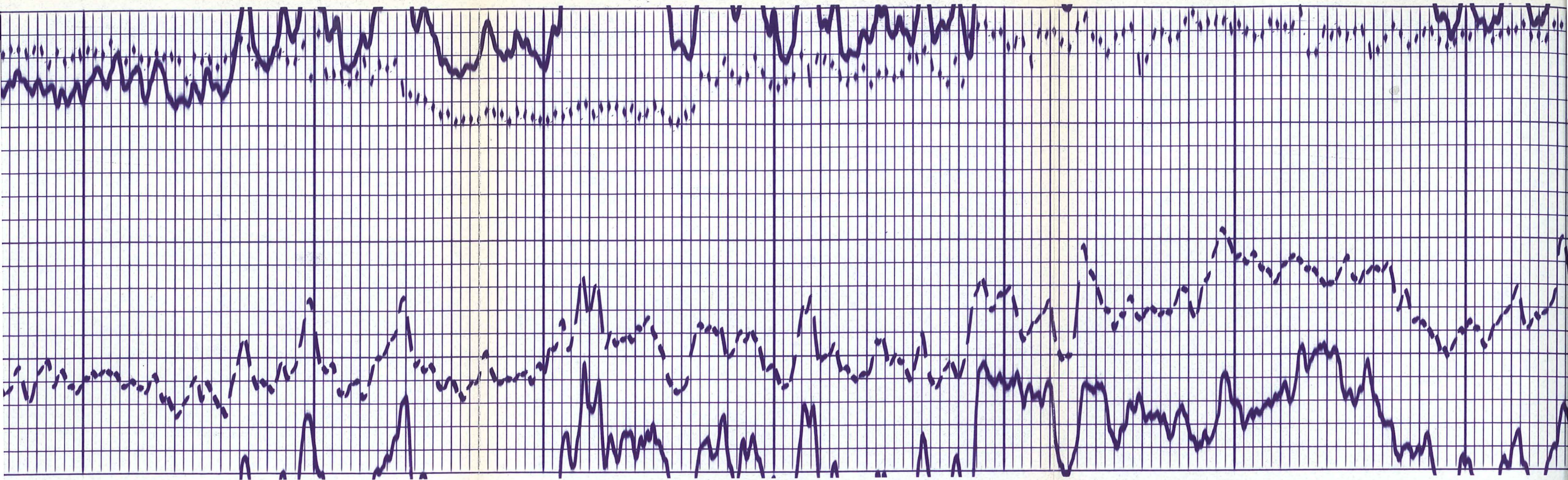


1900

2000

2100

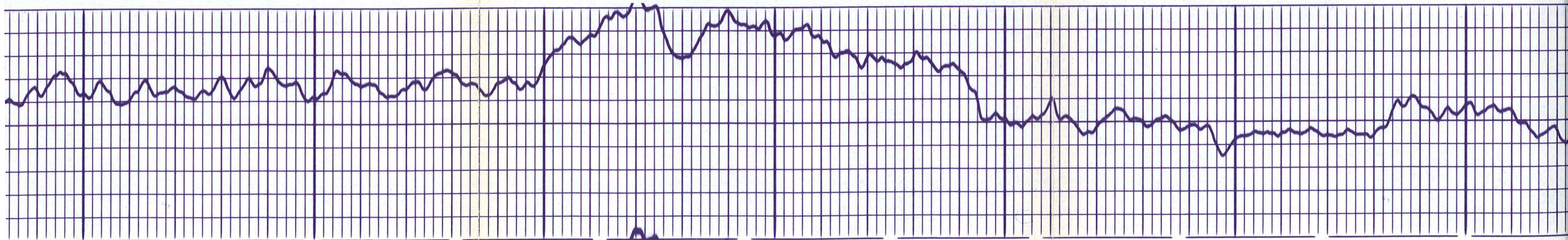




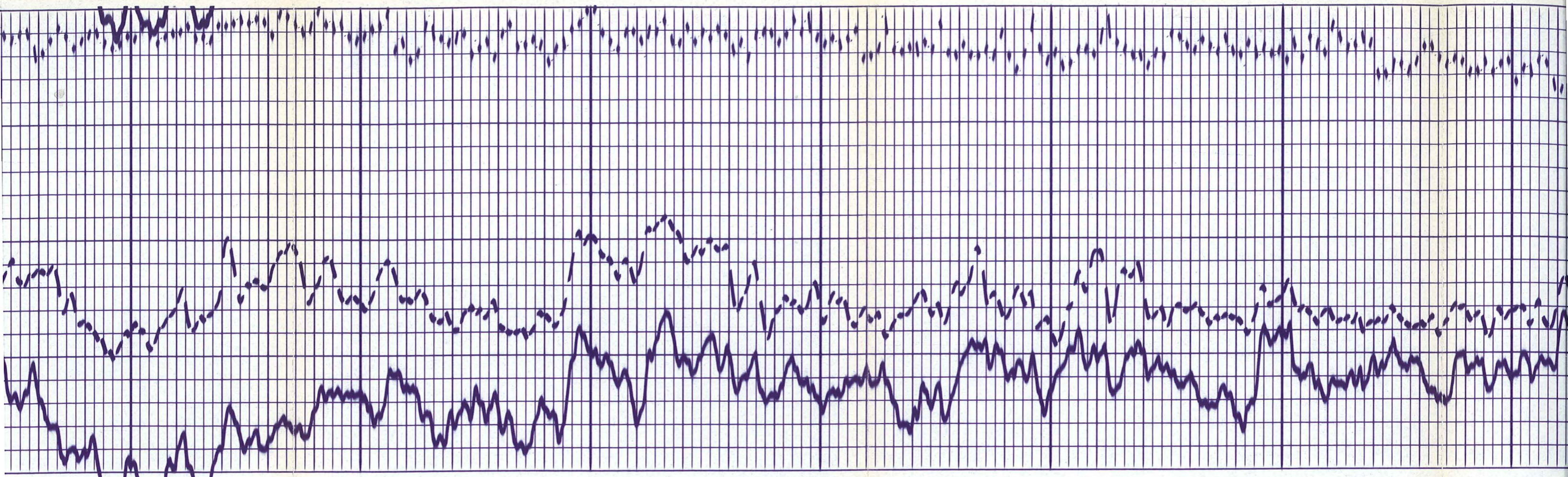
2200

2300

2400



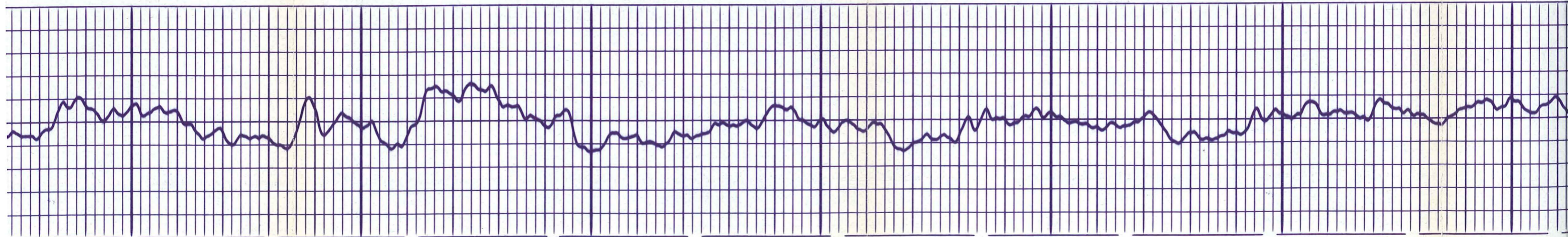


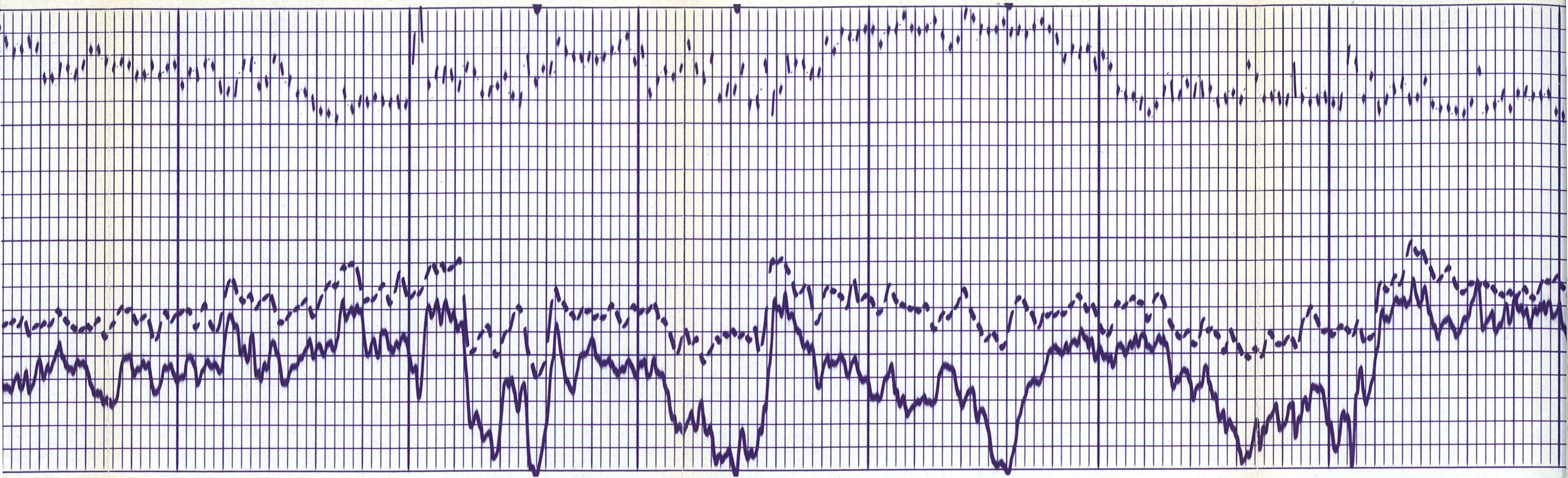


2500

2600

2700

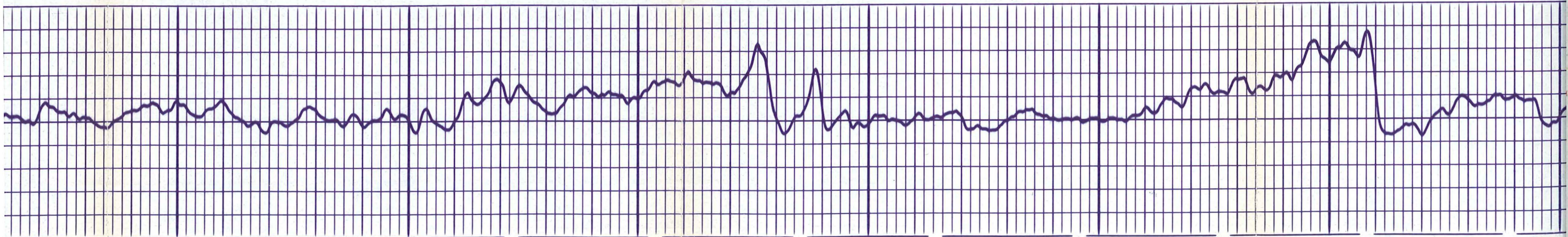


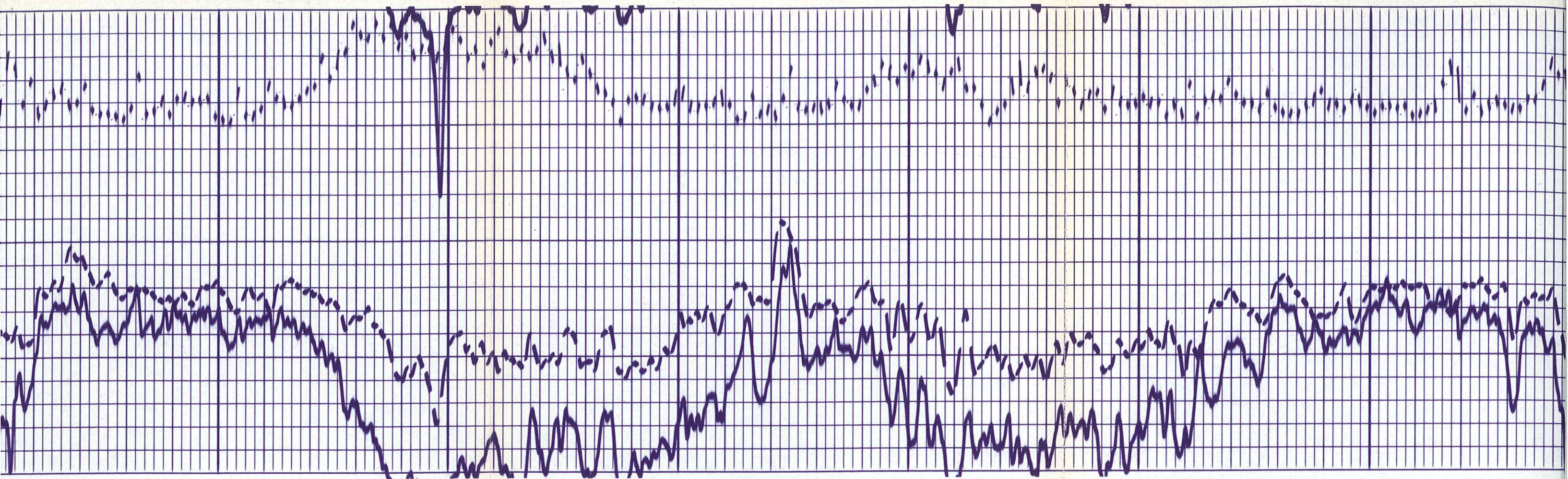


2800

2900

3000

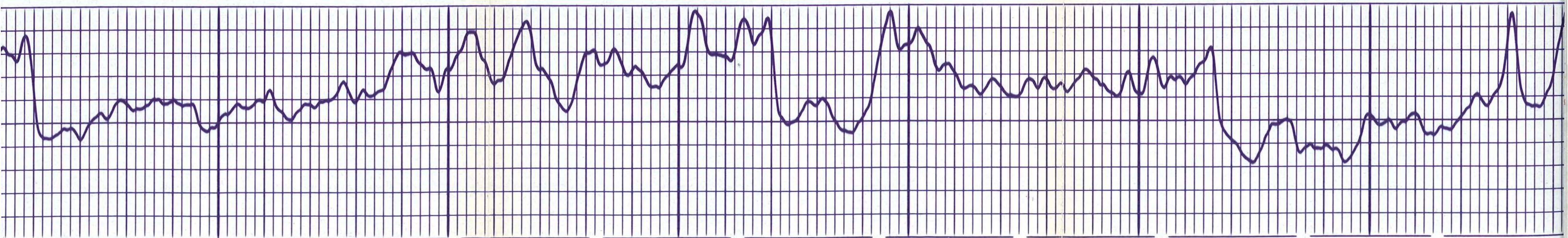


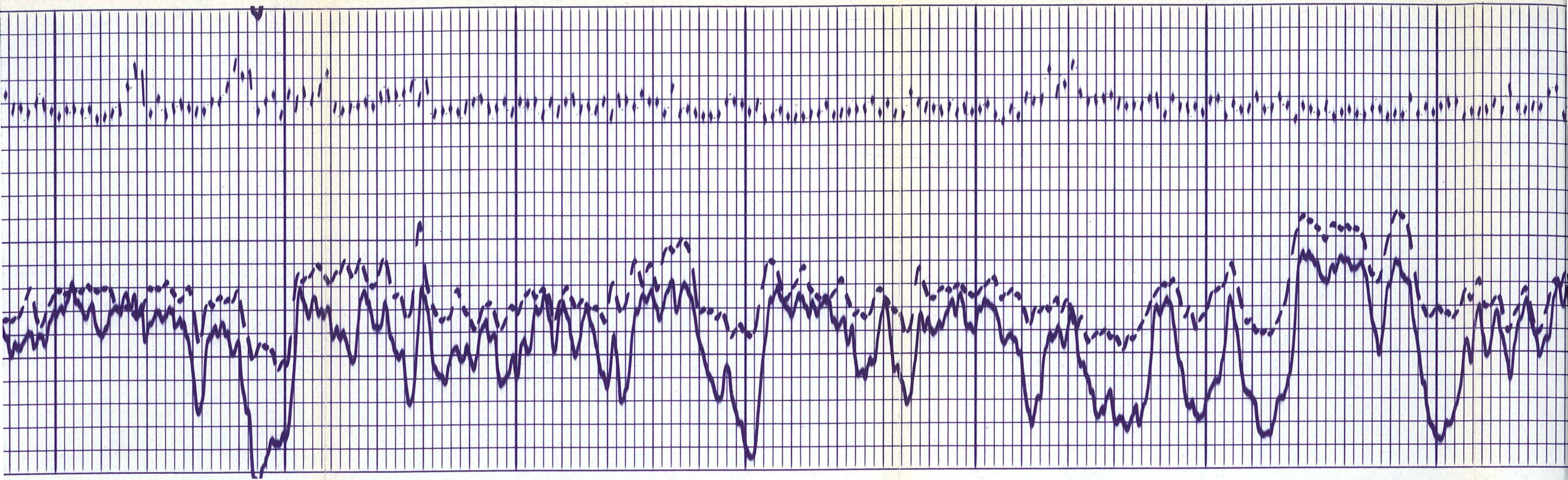


3100

3200

3300



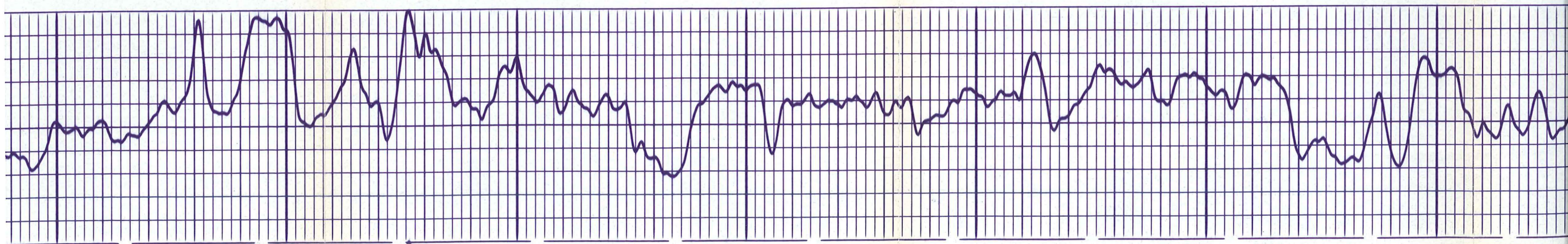


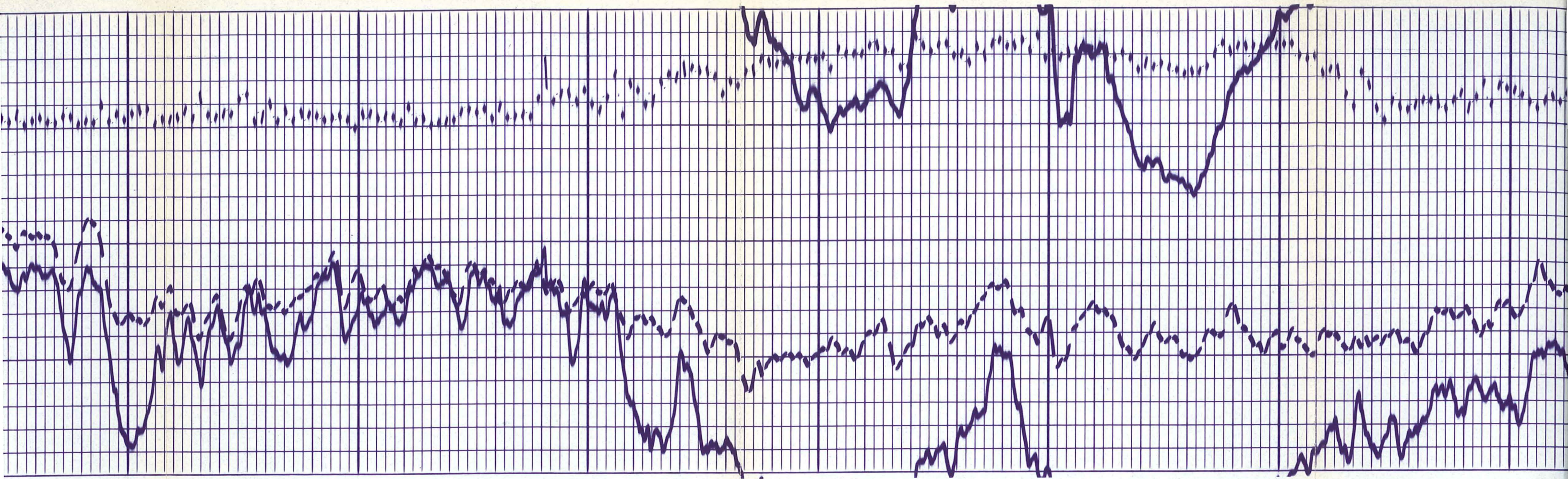
3300

3400

3500

3600



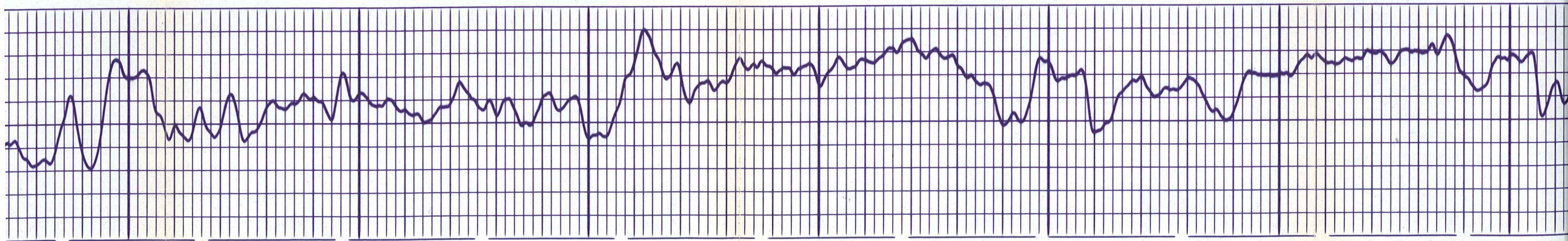


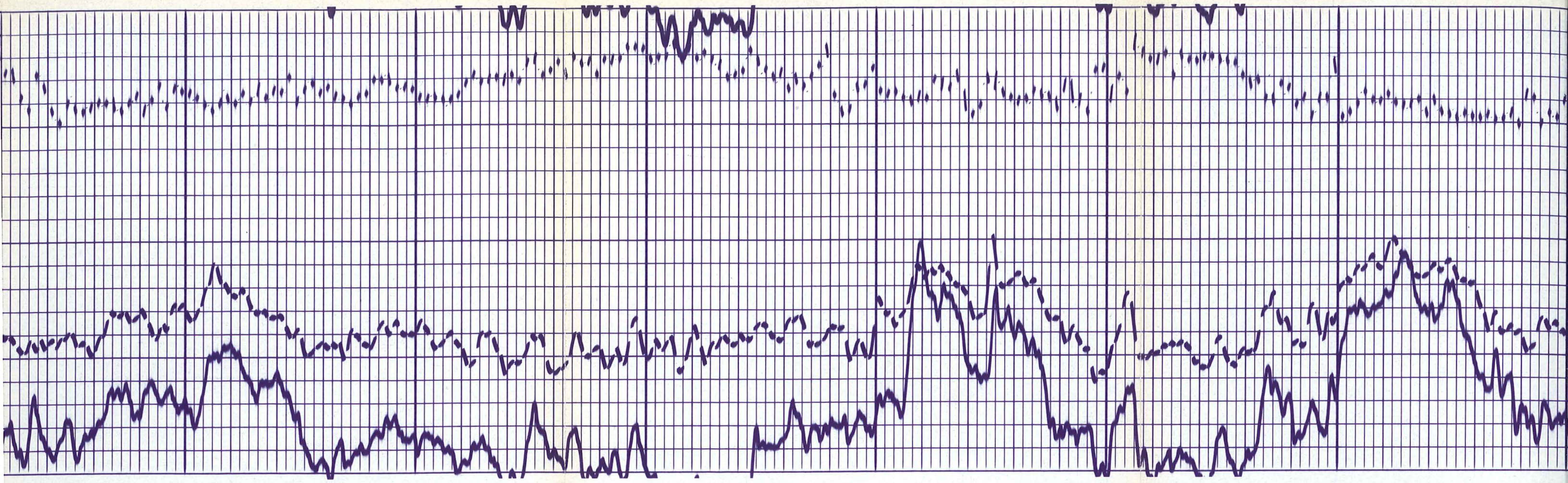
3600

3700

3800

3900



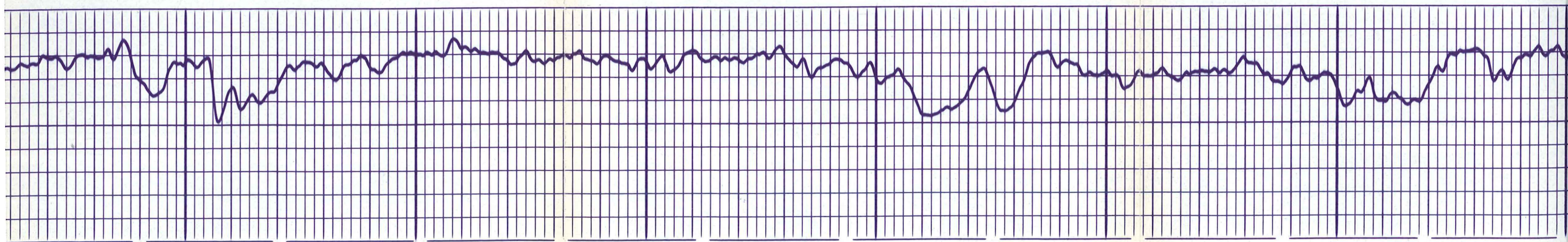


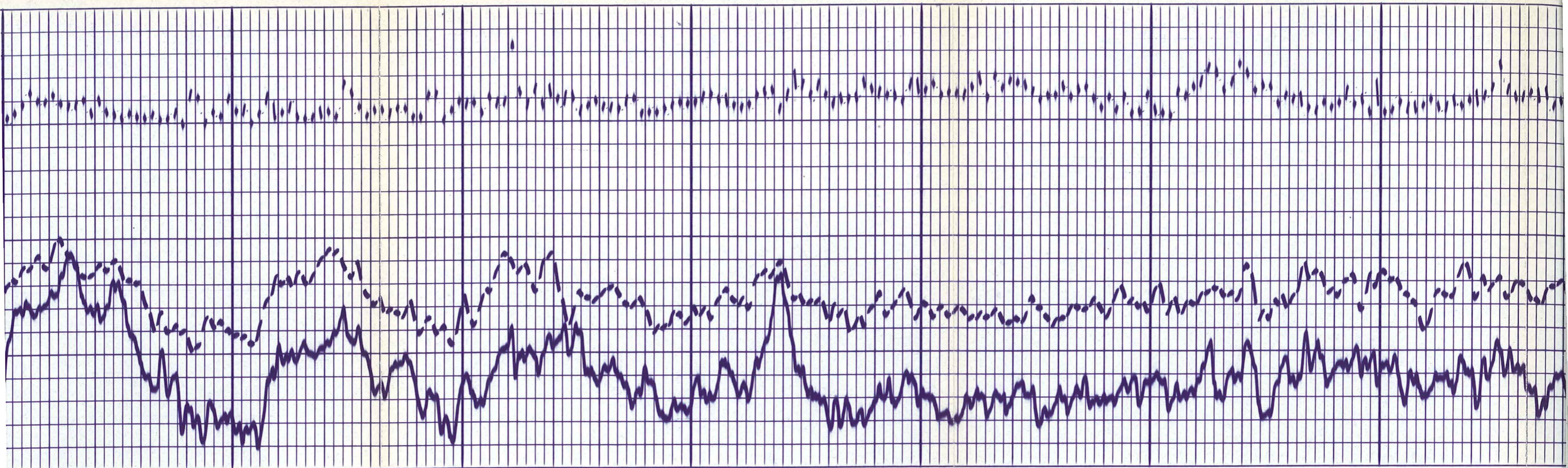
3900

4000

4100

4200

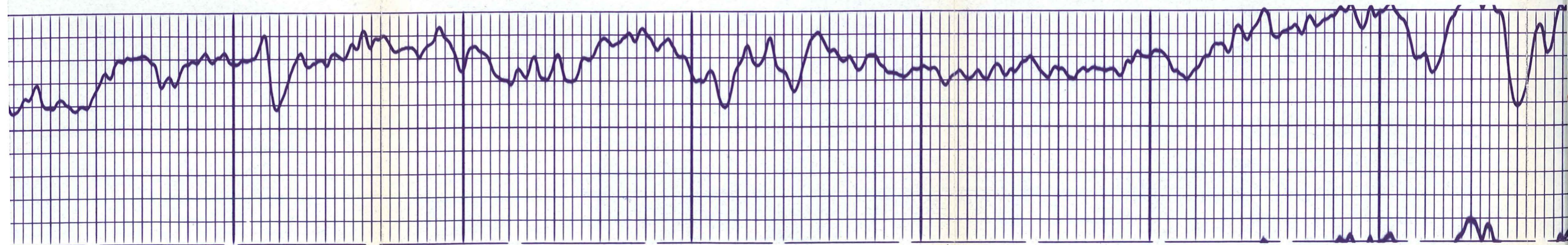


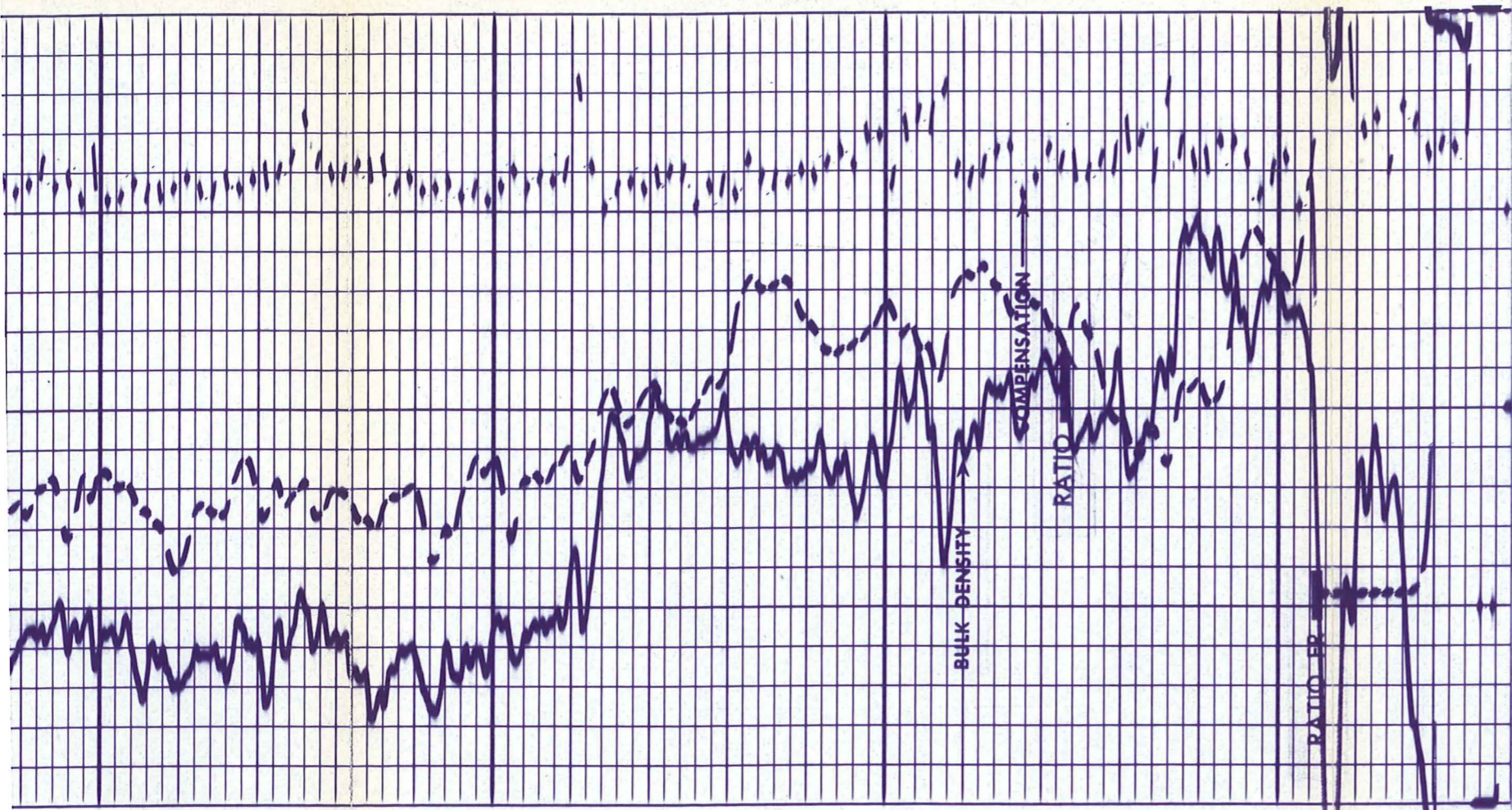


4200

4300

4400

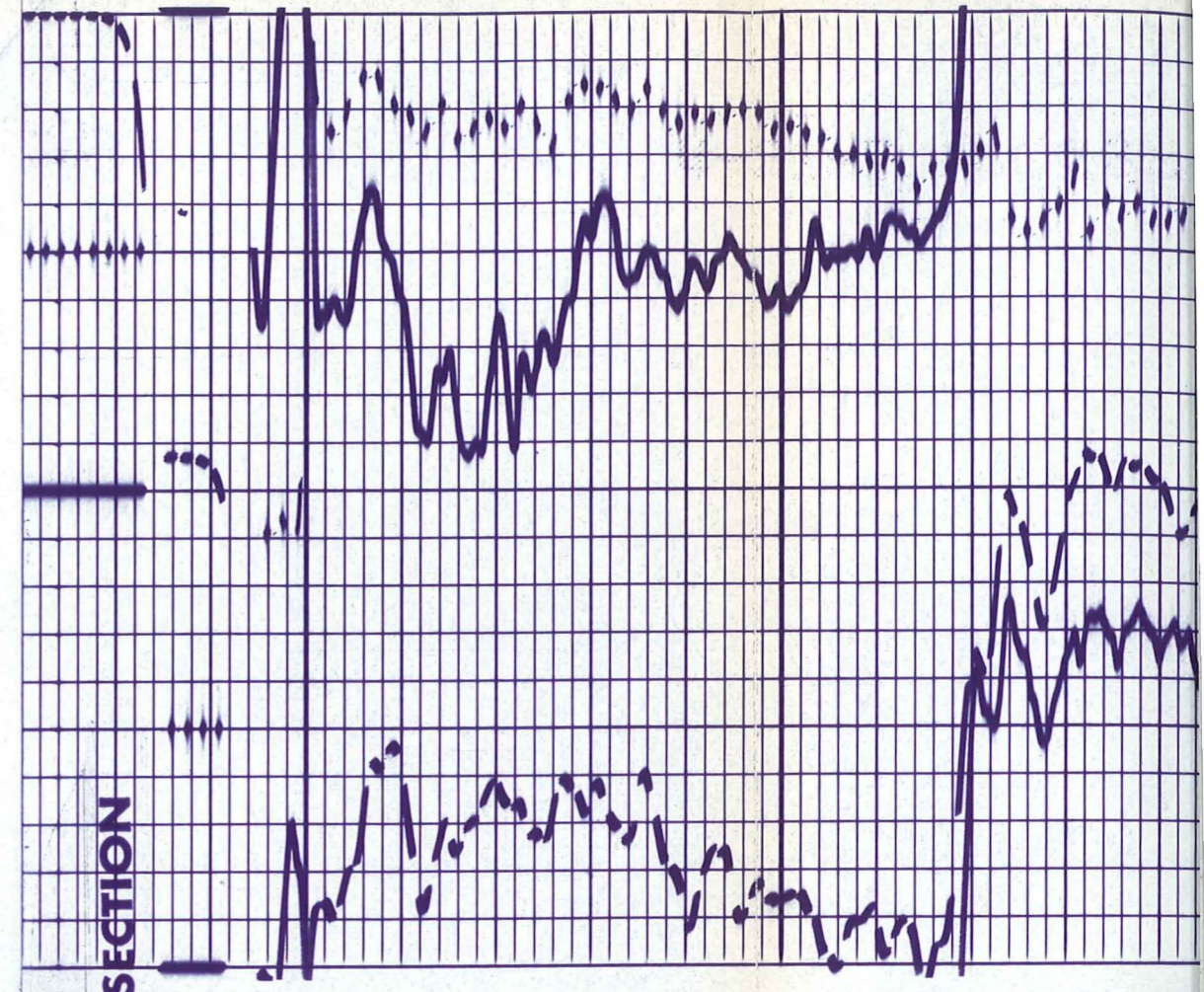
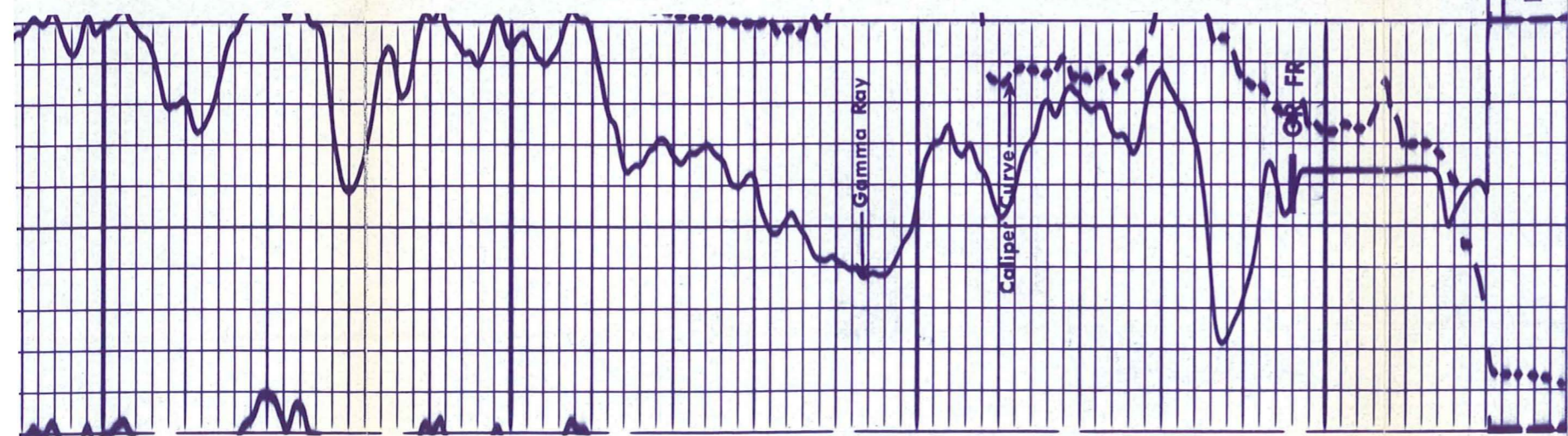




4500

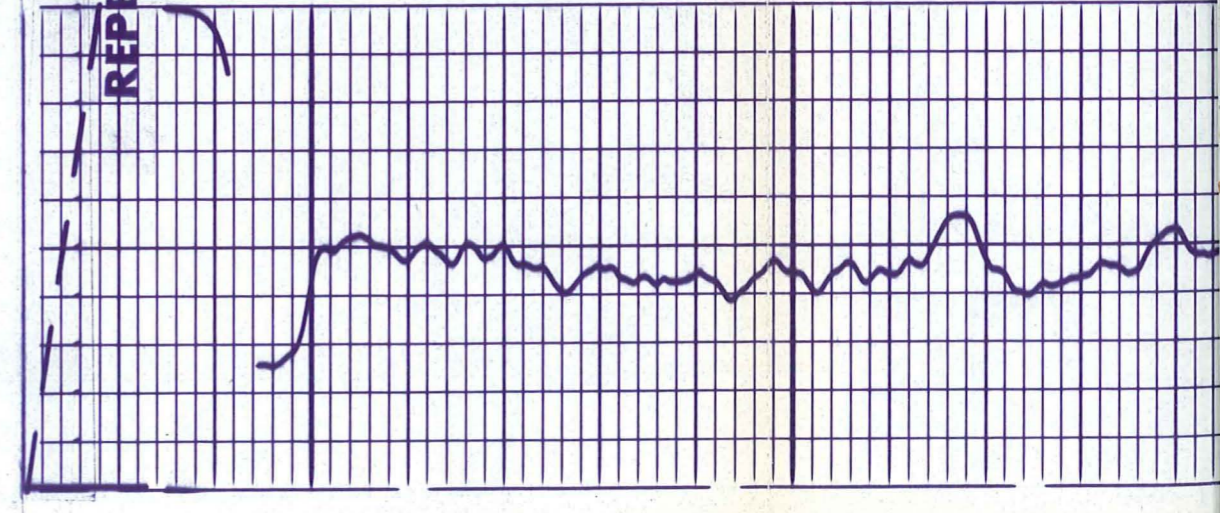
4600

Run 1

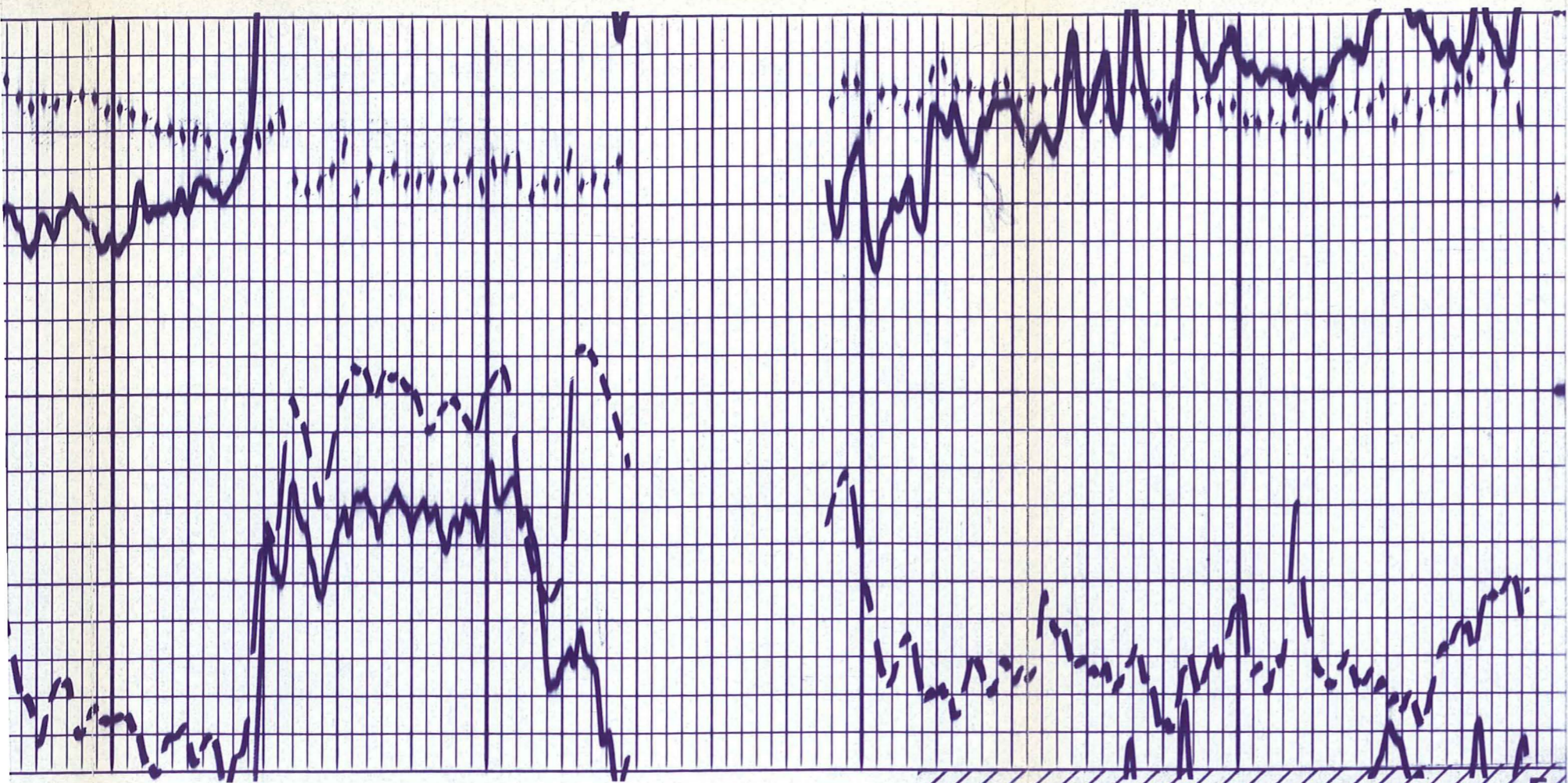


Run 1

REPEAT SECTION

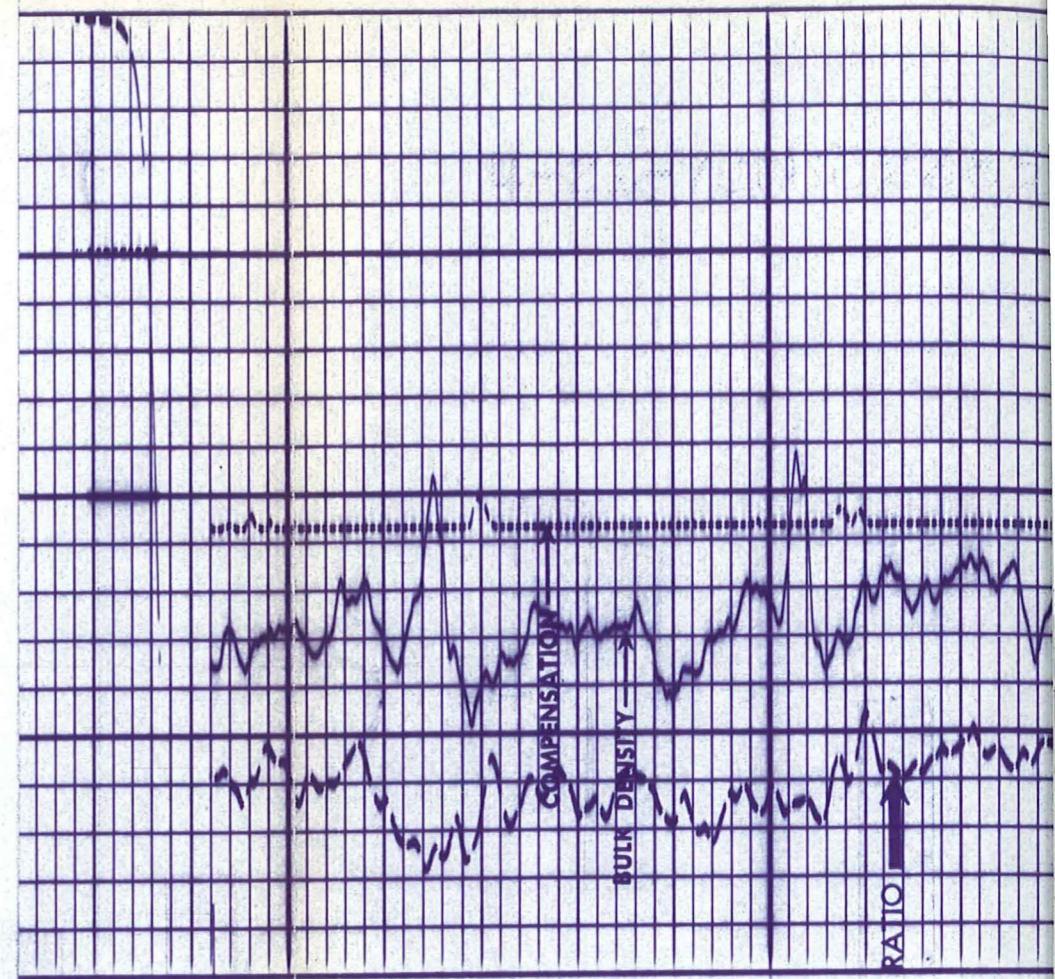






1000

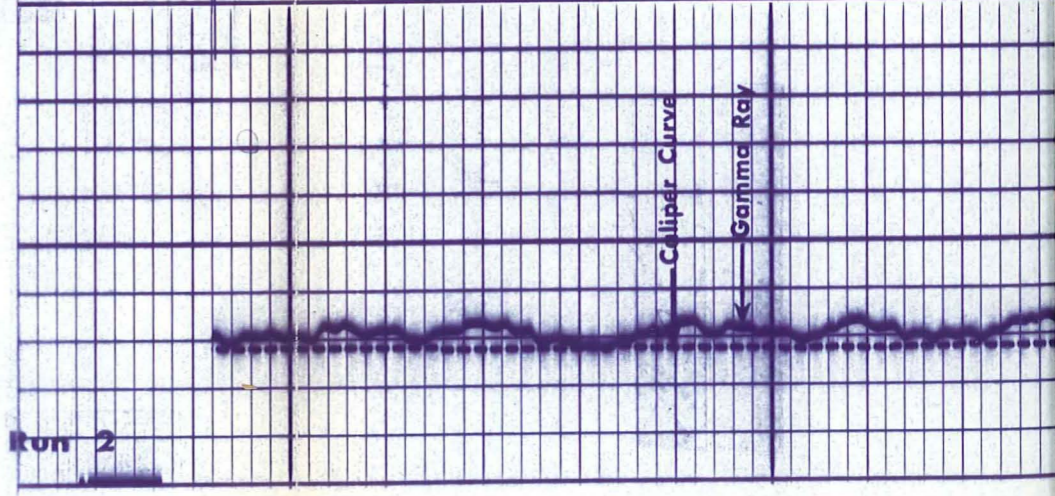
Run 1



Run 2

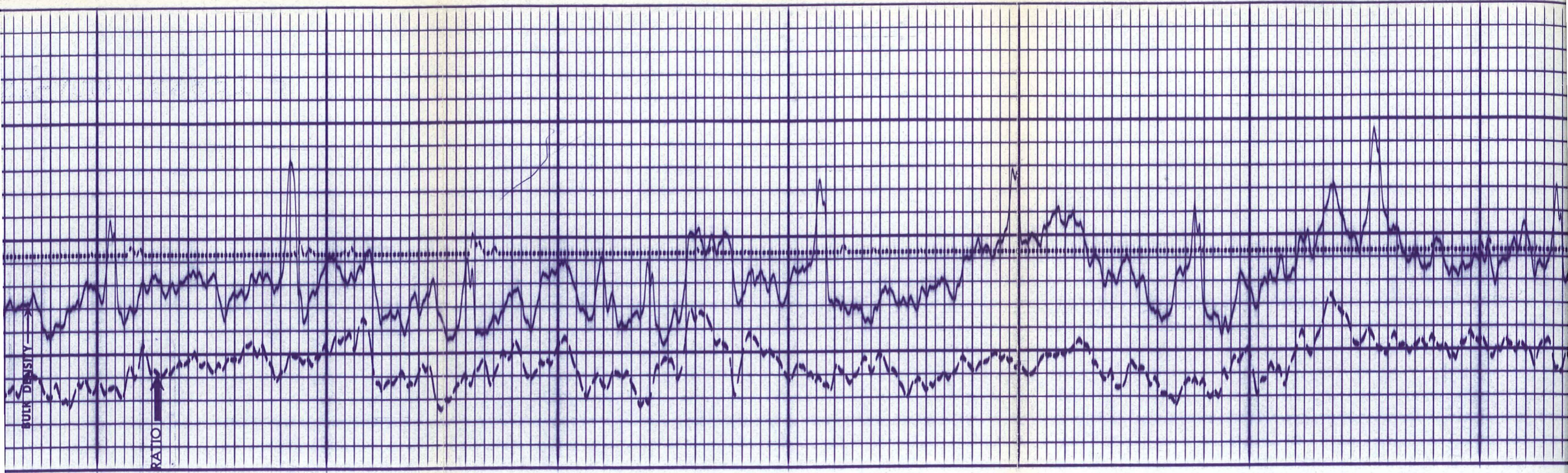
LR

2700



Run 2

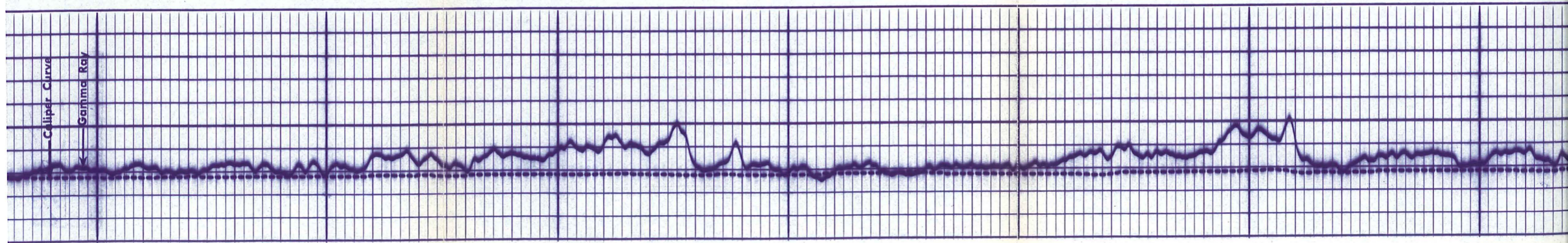




2800

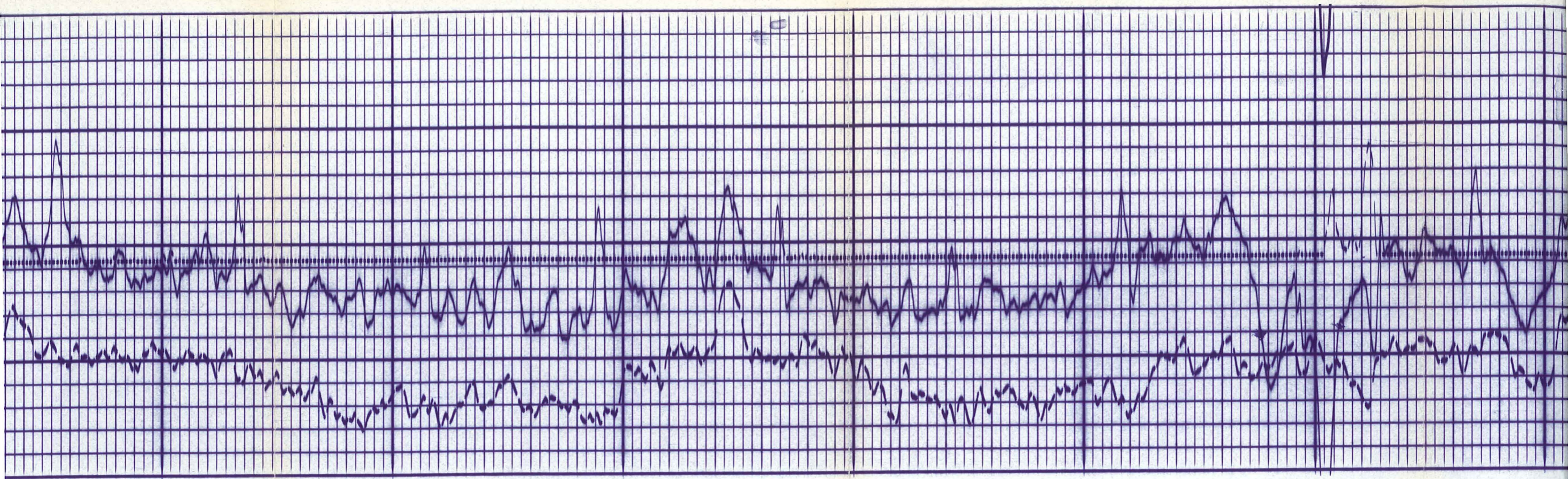
2900

3000



Coliper Curve

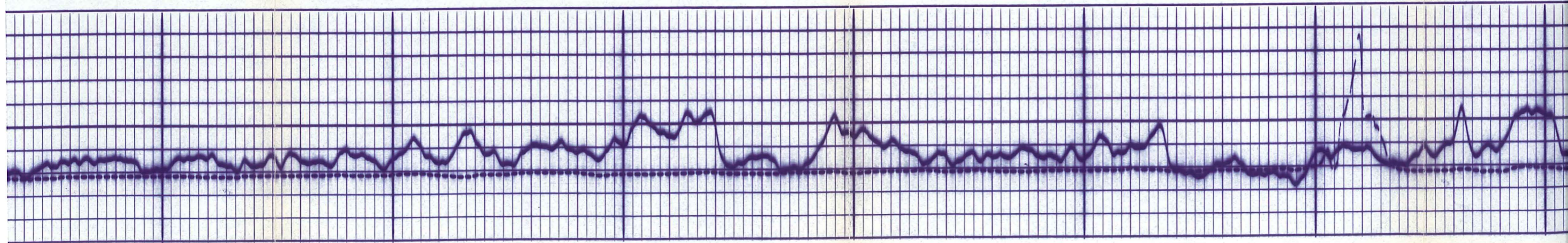
Gamma Ray

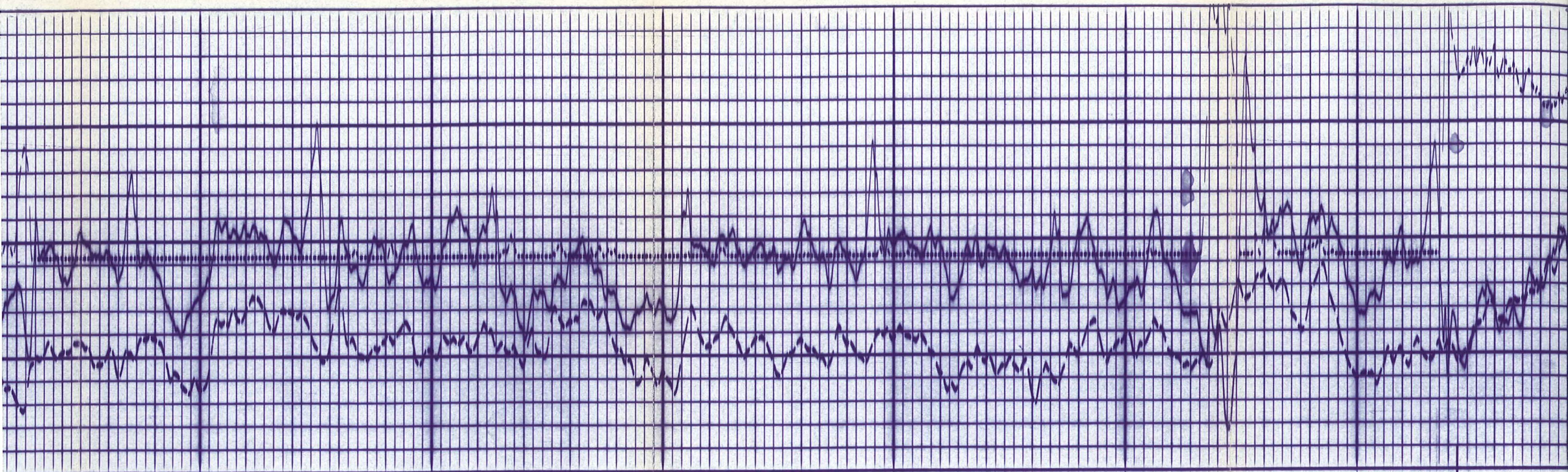


3100

3200

3300



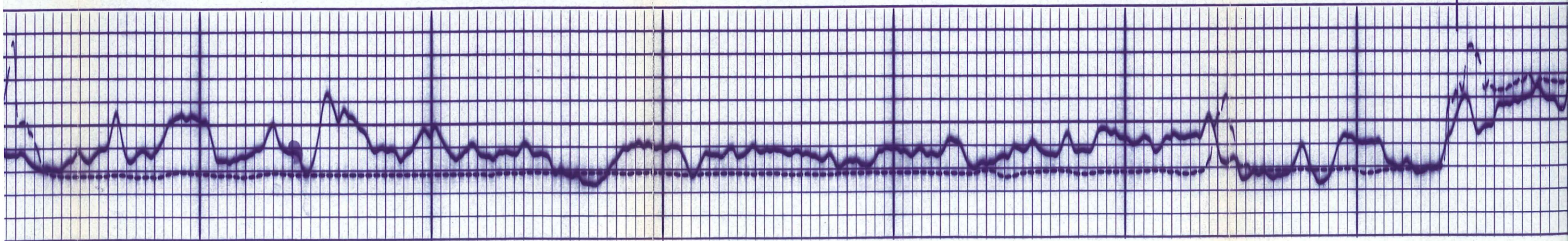


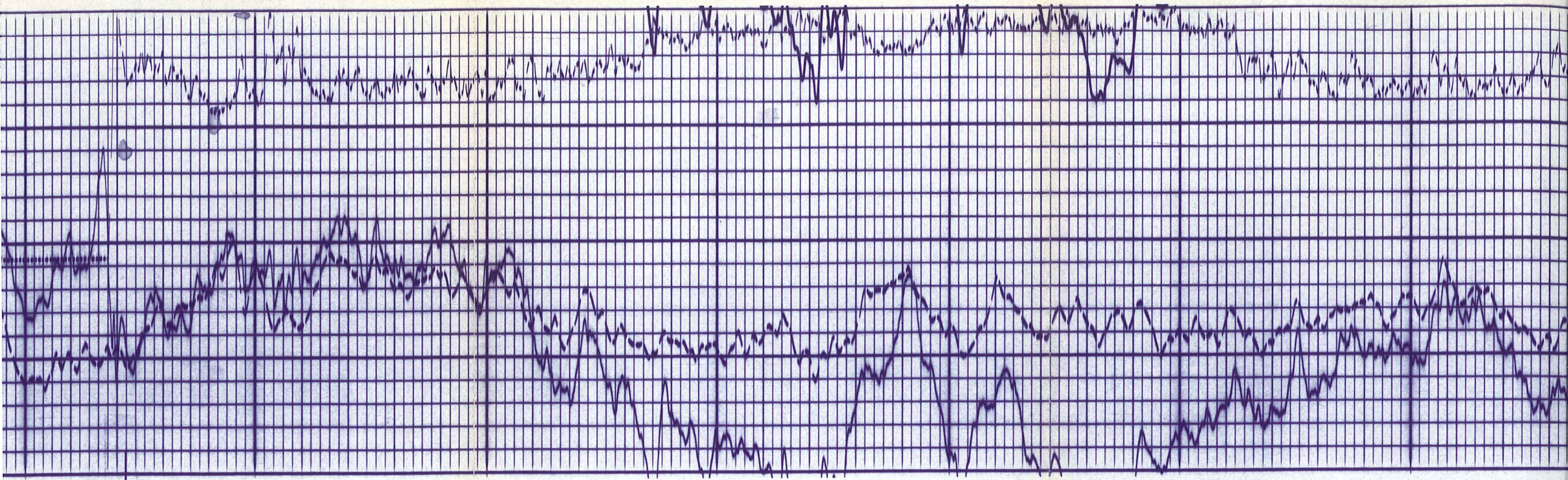
3400

3500

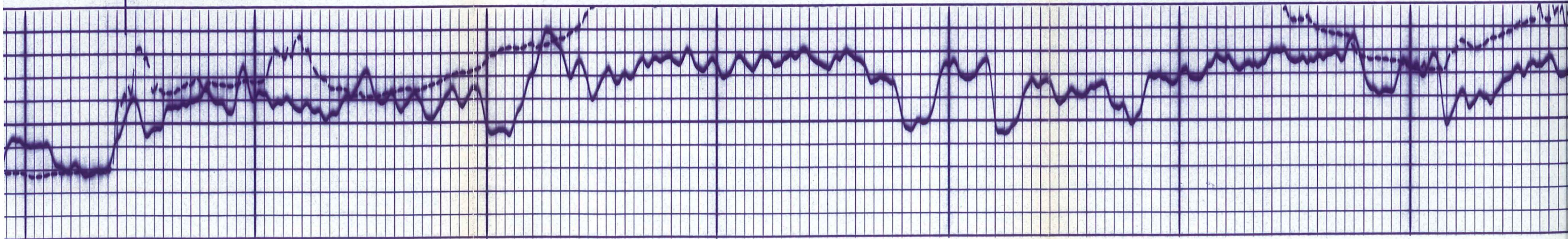
3600

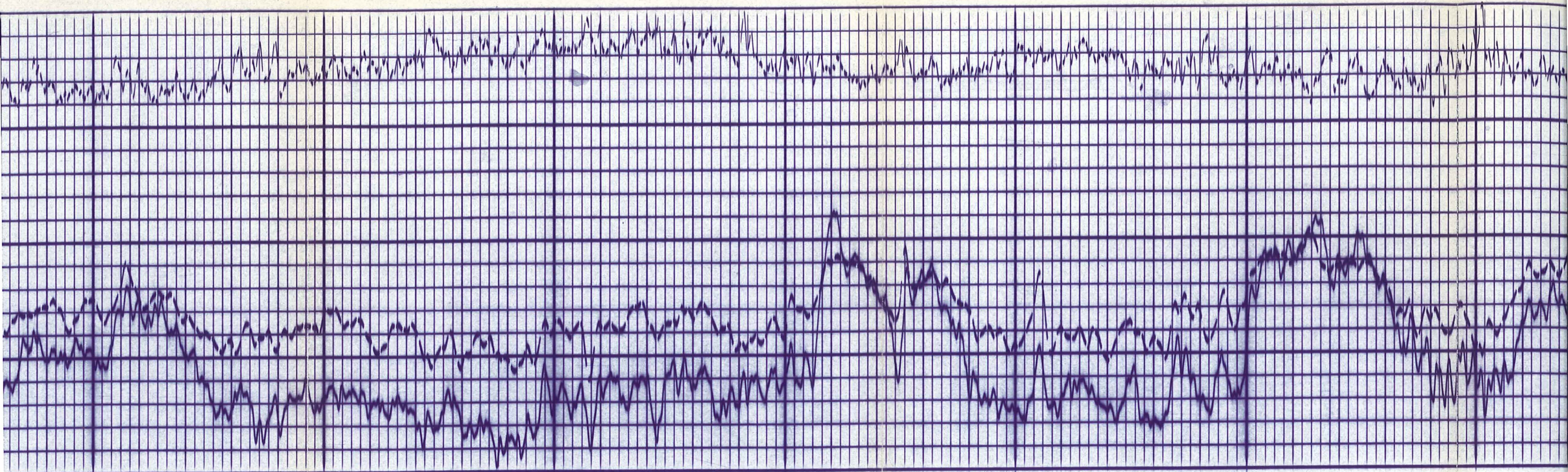
Casing





3600      Casing      3700      3800      3900



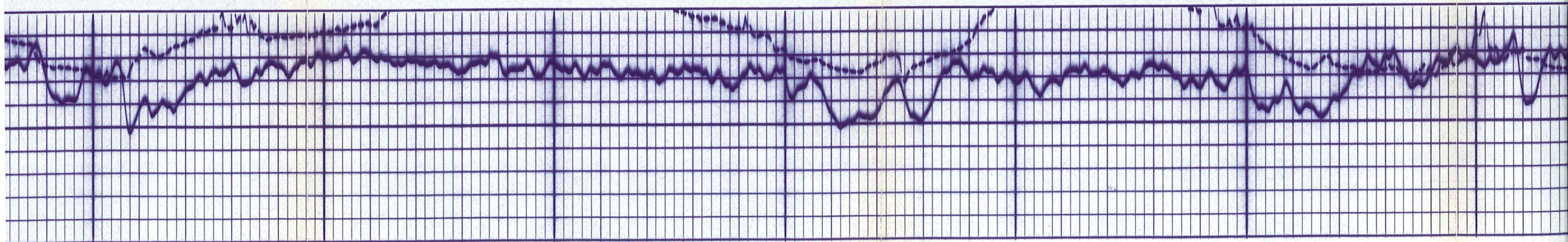


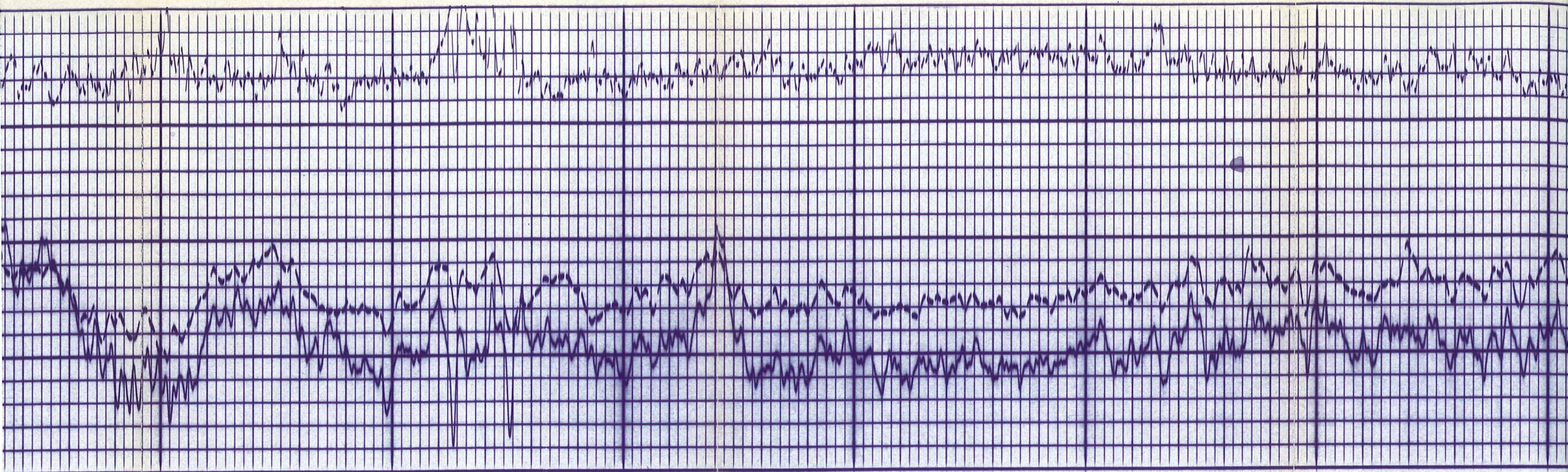
3900

4000

4100

4200



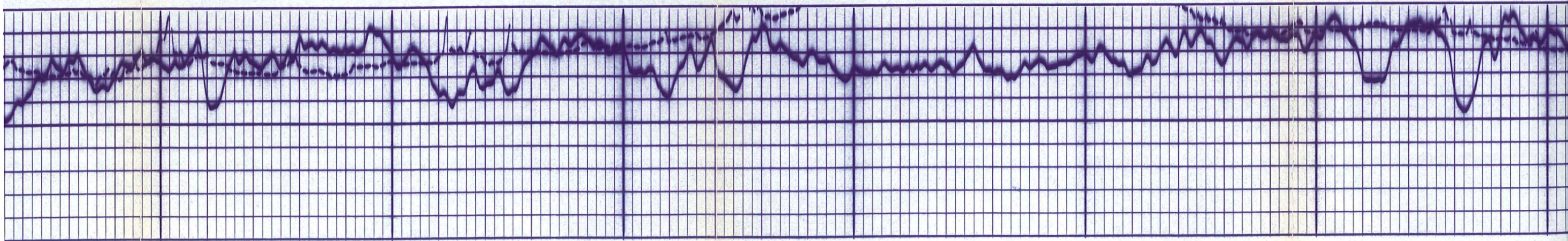


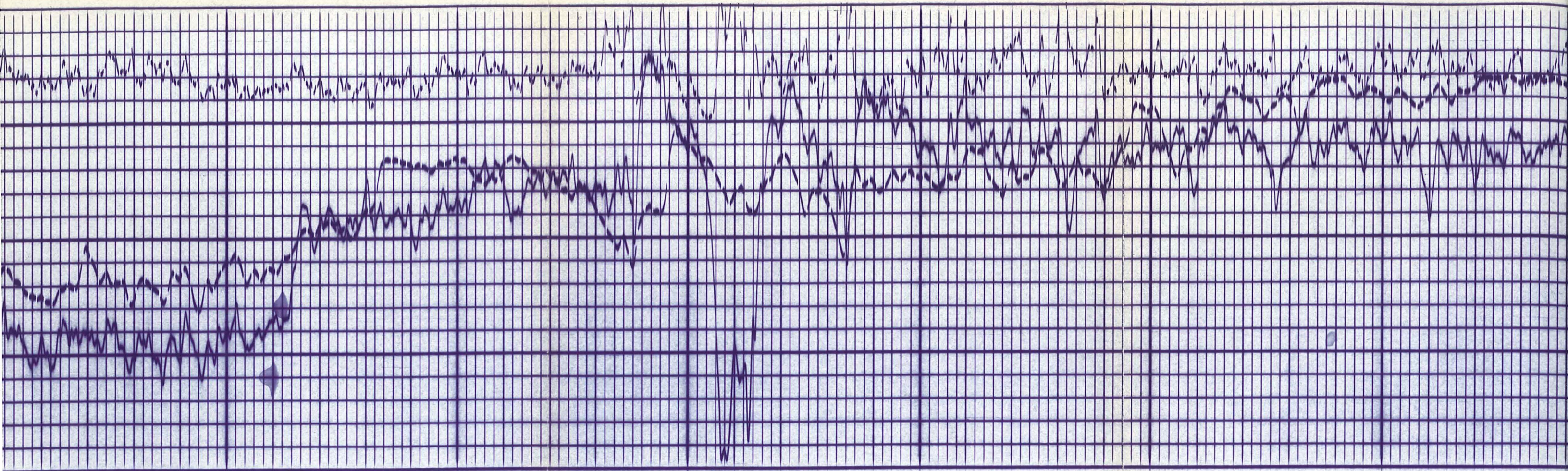
4200

4300

4400

4500

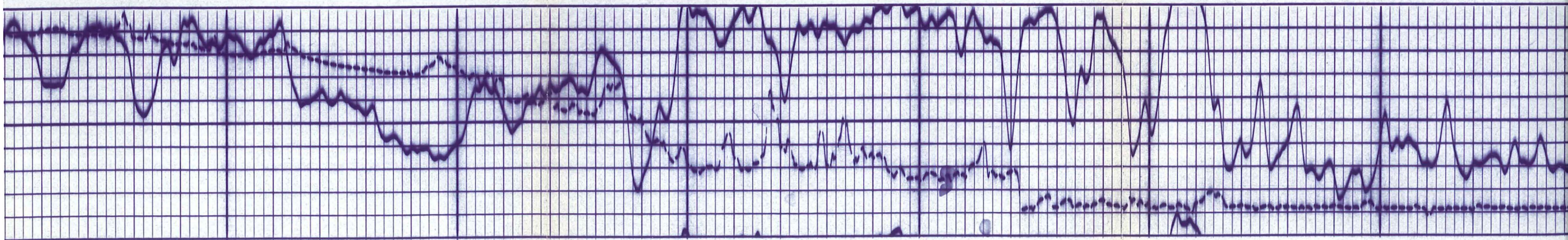




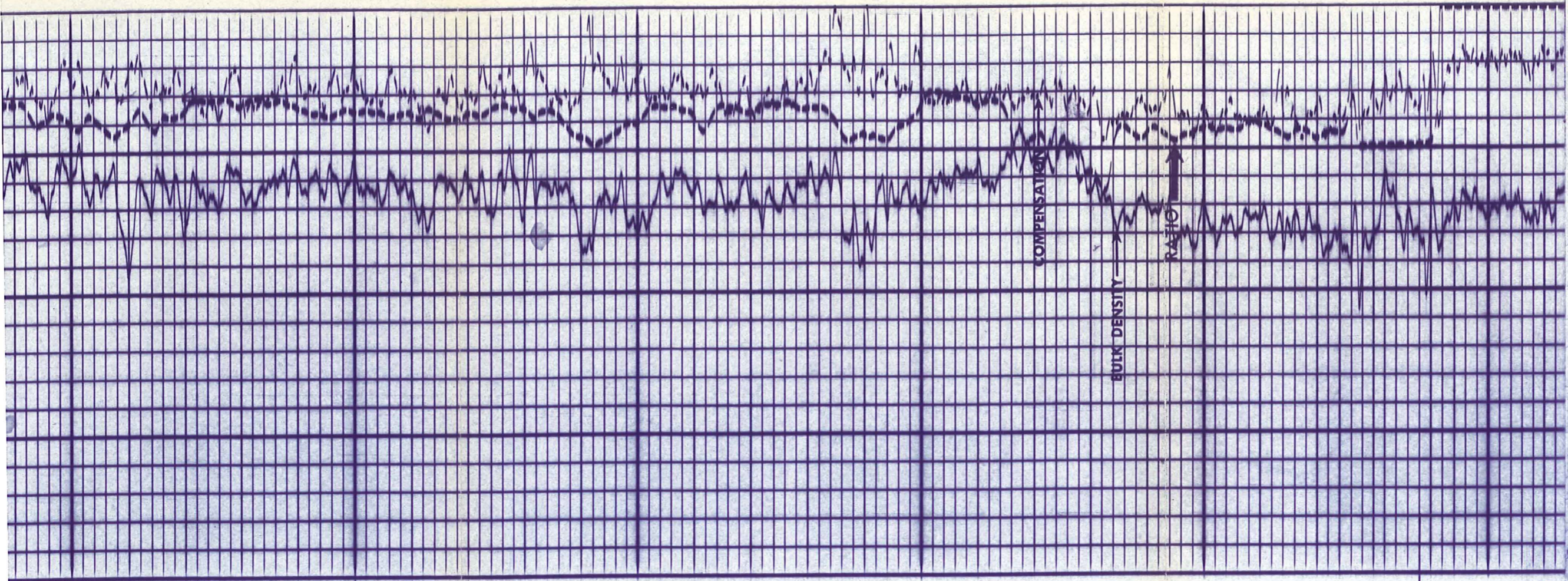
4500

4600

4700





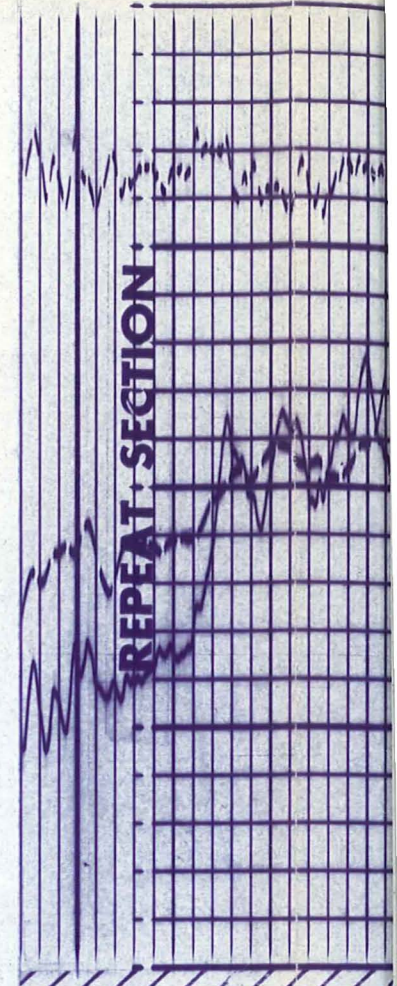
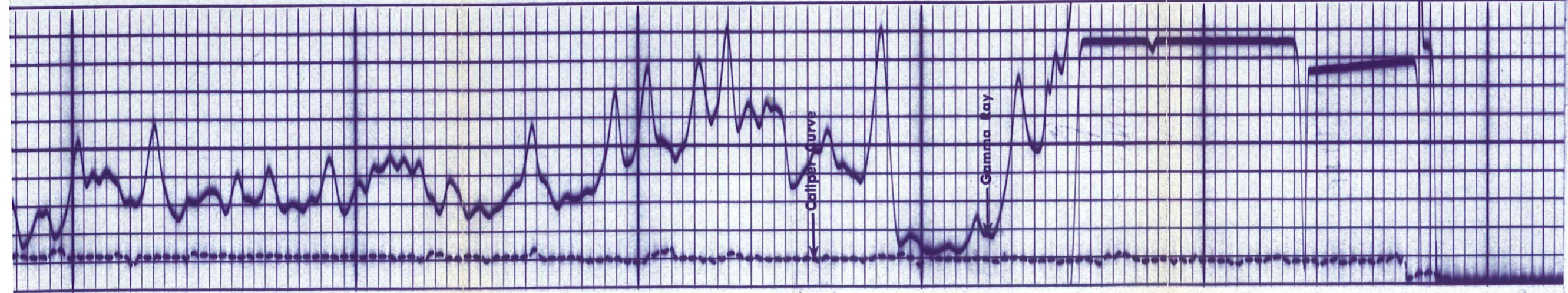


4800

4900

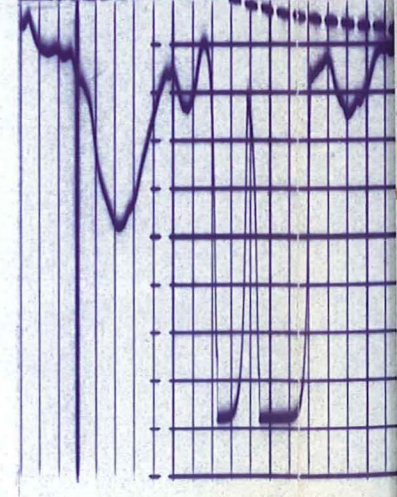
5000

Run 2

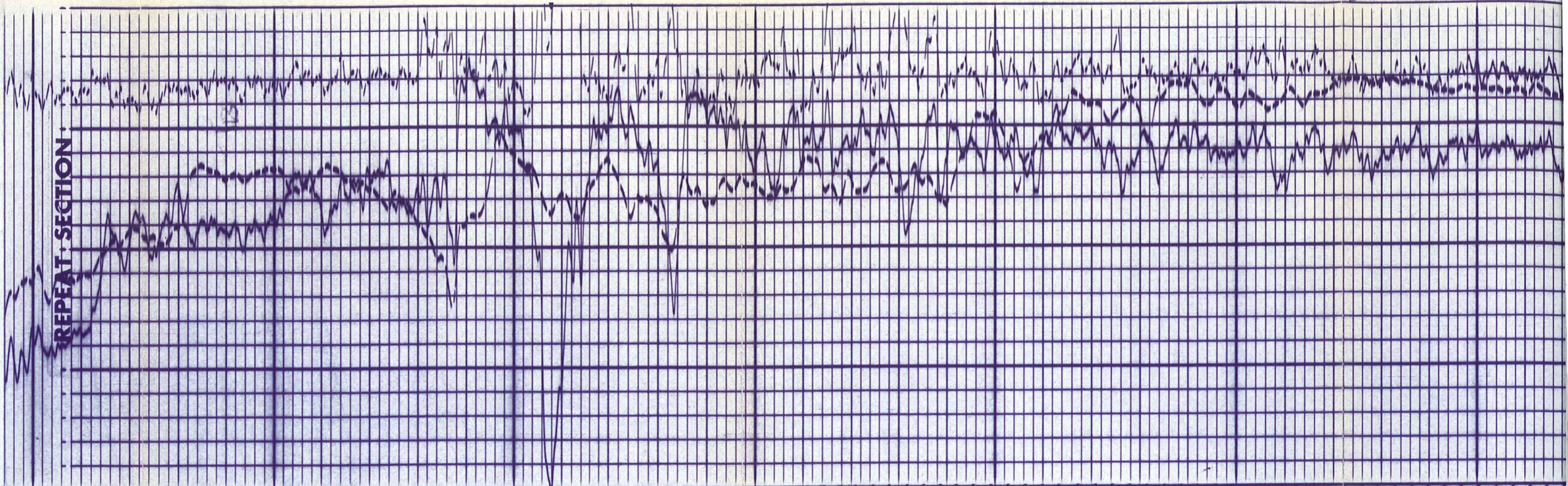


REPEAT SECTION

4500 HORIZER OUT

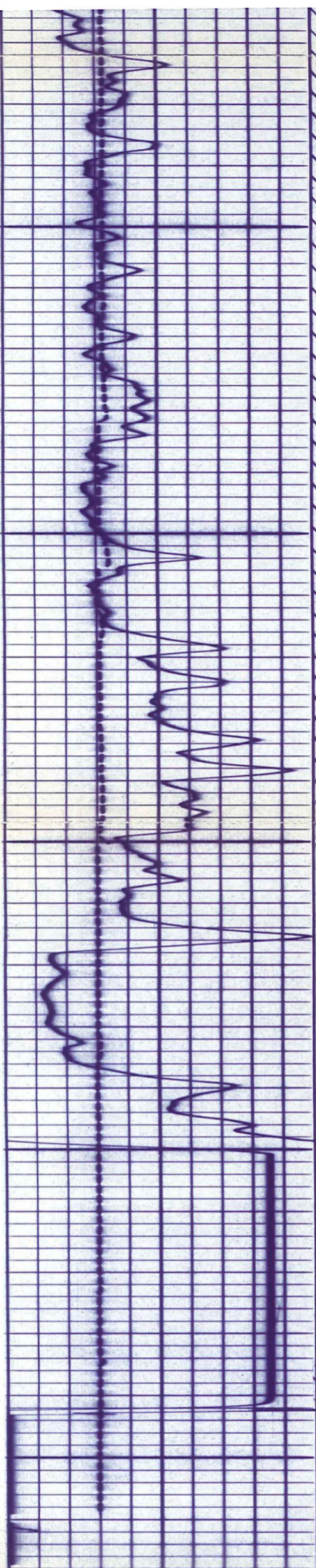


REPEAT SECTION

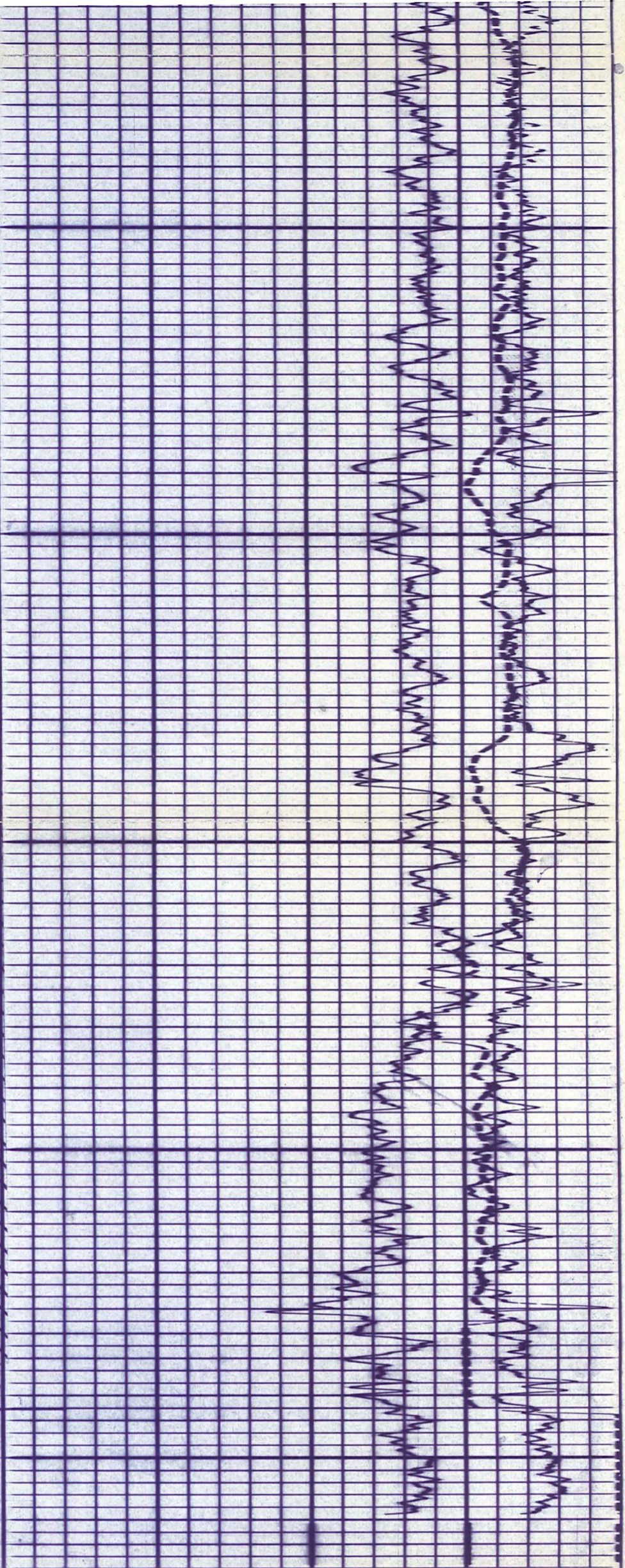


MEMORIZER OUT — CURVES INVALID

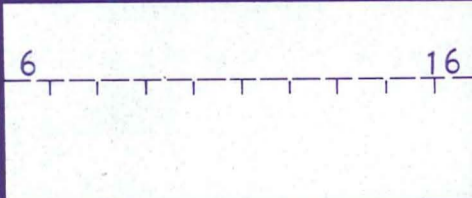




4500 MEMORIZER OUT — CURVES INVALID  
 4900 MEMORIZER OUT — CURVES INVALID  
 5000  
 Run 2

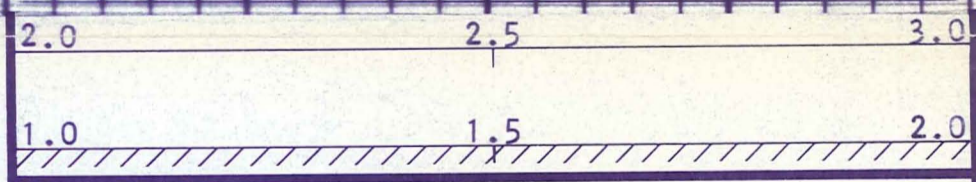


**GAMMA RAY**  
API UNITS

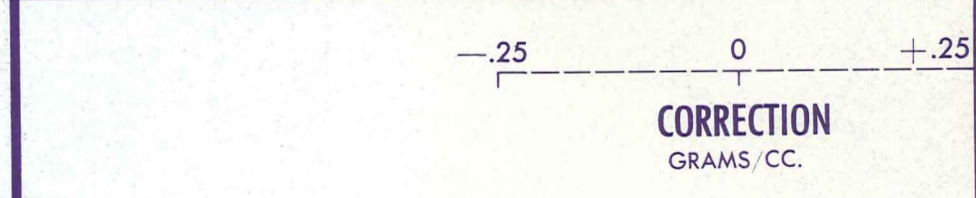


**CALIPER**  
HOLE DIAM. IN INCHES

DEPTHS

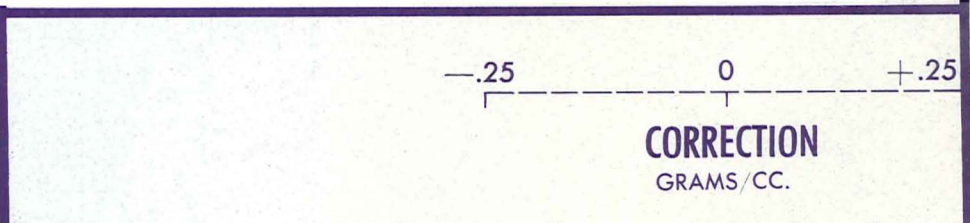
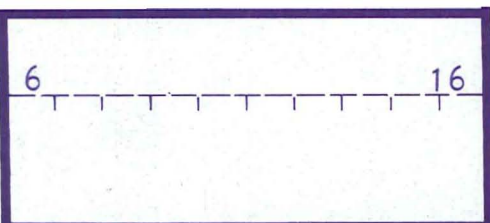


**BULK DENSITY**  
GRAMS/CC.



**CORRECTION**  
GRAMS/CC.

COMPANY	AEROJET NUCLEAR - INEL	SCHL. FR	4992
WELL	RRGE #1	SCHL. TD	5002
		DRLR TD	5007



**CALIPER**  
HOLE DIAM. IN INCHES

DEPTH

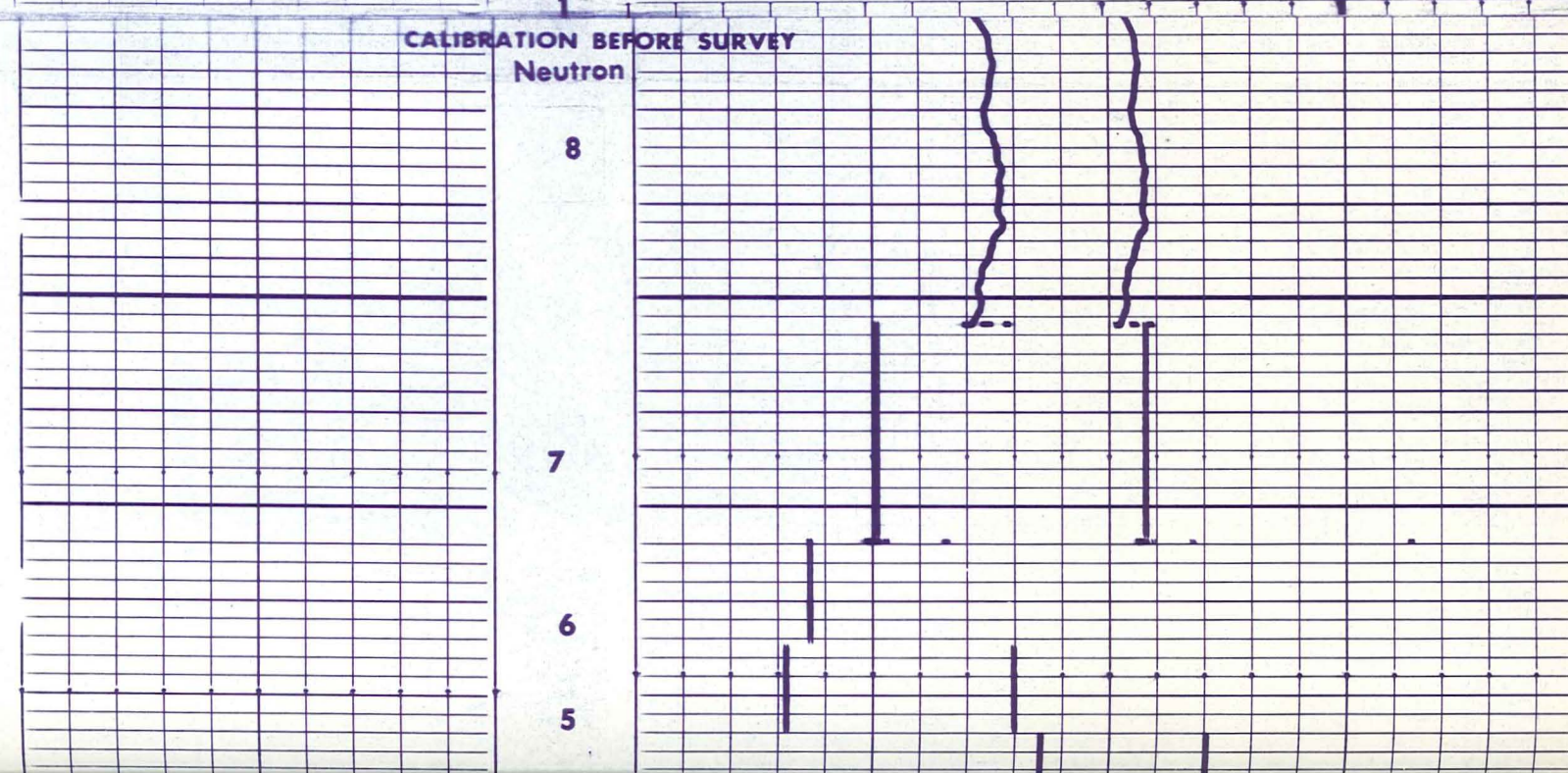
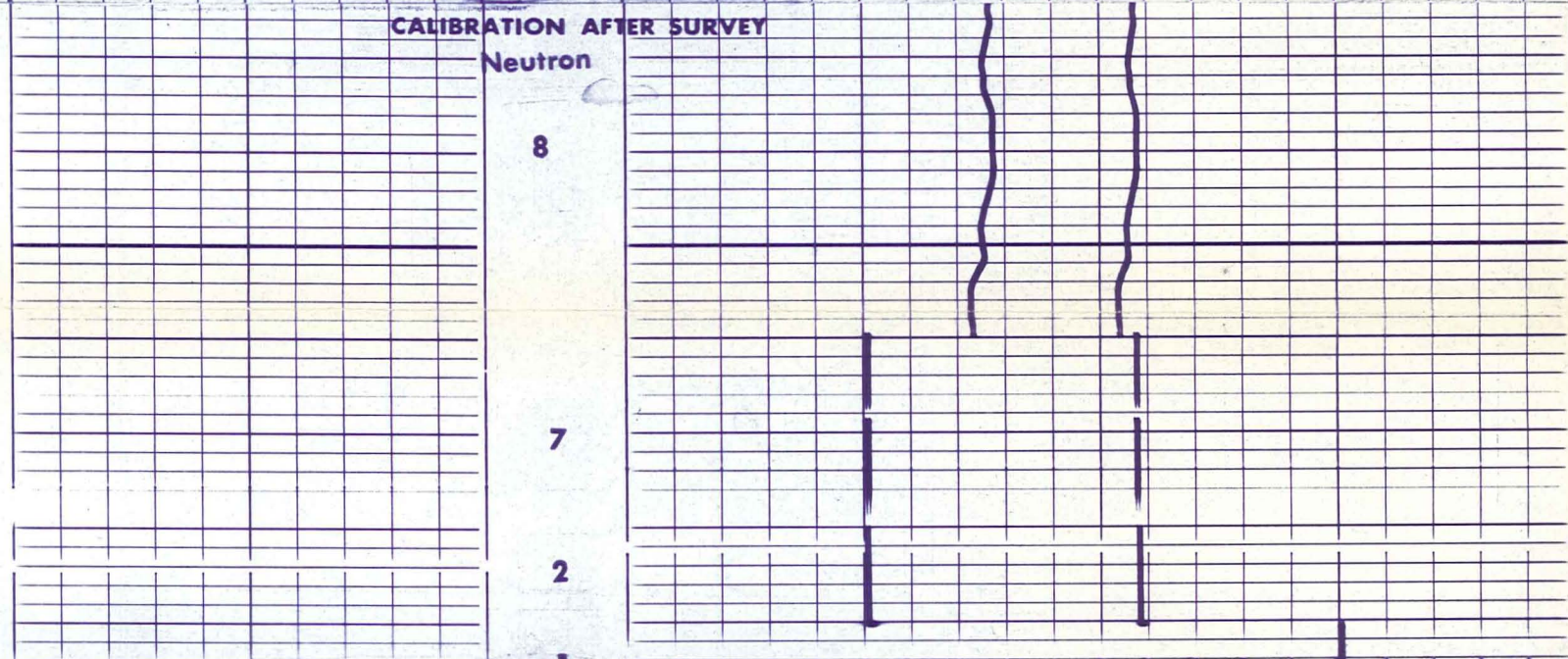
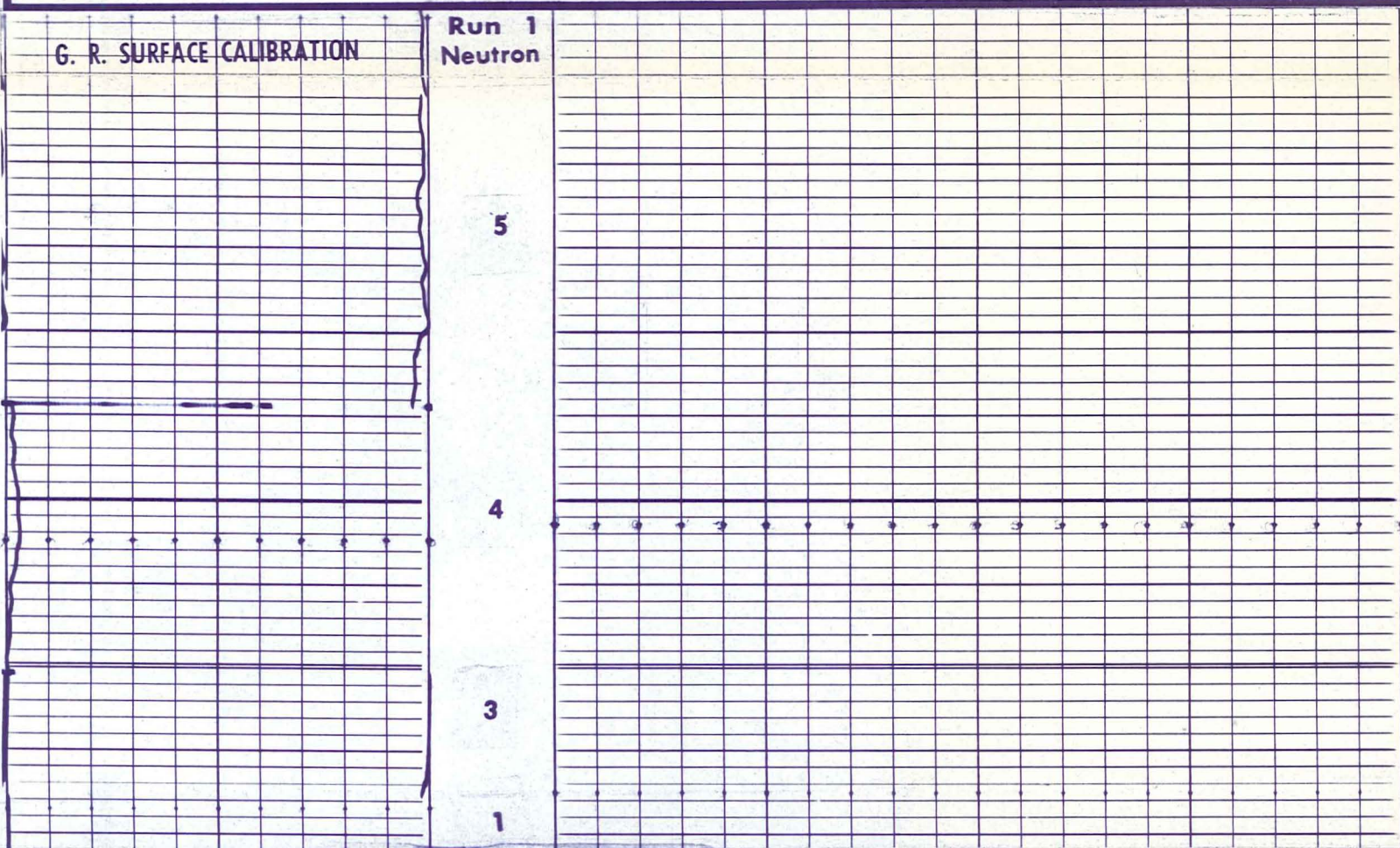
CORRECTION  
GRAMS / CC.

CNL RATIO  
5.0 ----- 2.5 ----- 0

COMPANY AEROJET NUCLEAR - INEL SCHL. FR 4992  
 WELL RRGE #1 SCHL. TD 5002  
 FIELD RAFT RIVER GEOTHERMAL DRLR TD 5007  
 COUNTY CASSIA STATE IDAHO Elev: KB ----  
 DF ----  
 GL 4835

**CALIBRATION RECORD**

↓



7

6

5

4

3

2

1

CALIBRATION AFTER SURVEY  
Density

13

12

11

2

1

CALIBRATION BEFORE SURVEY  
Density

13

12

11

10

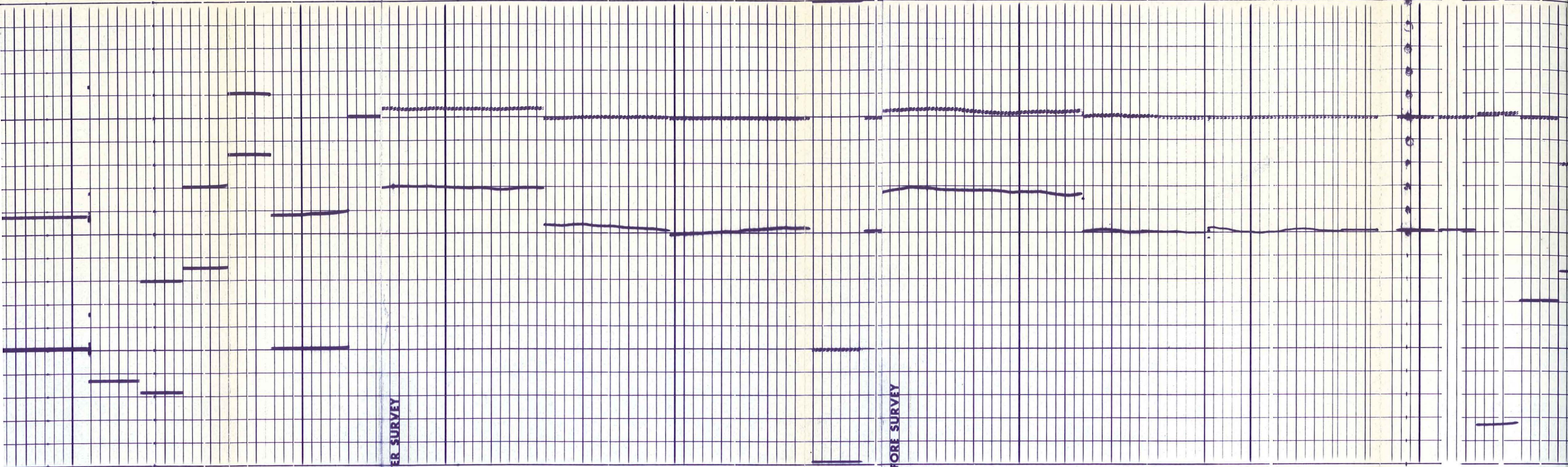
9

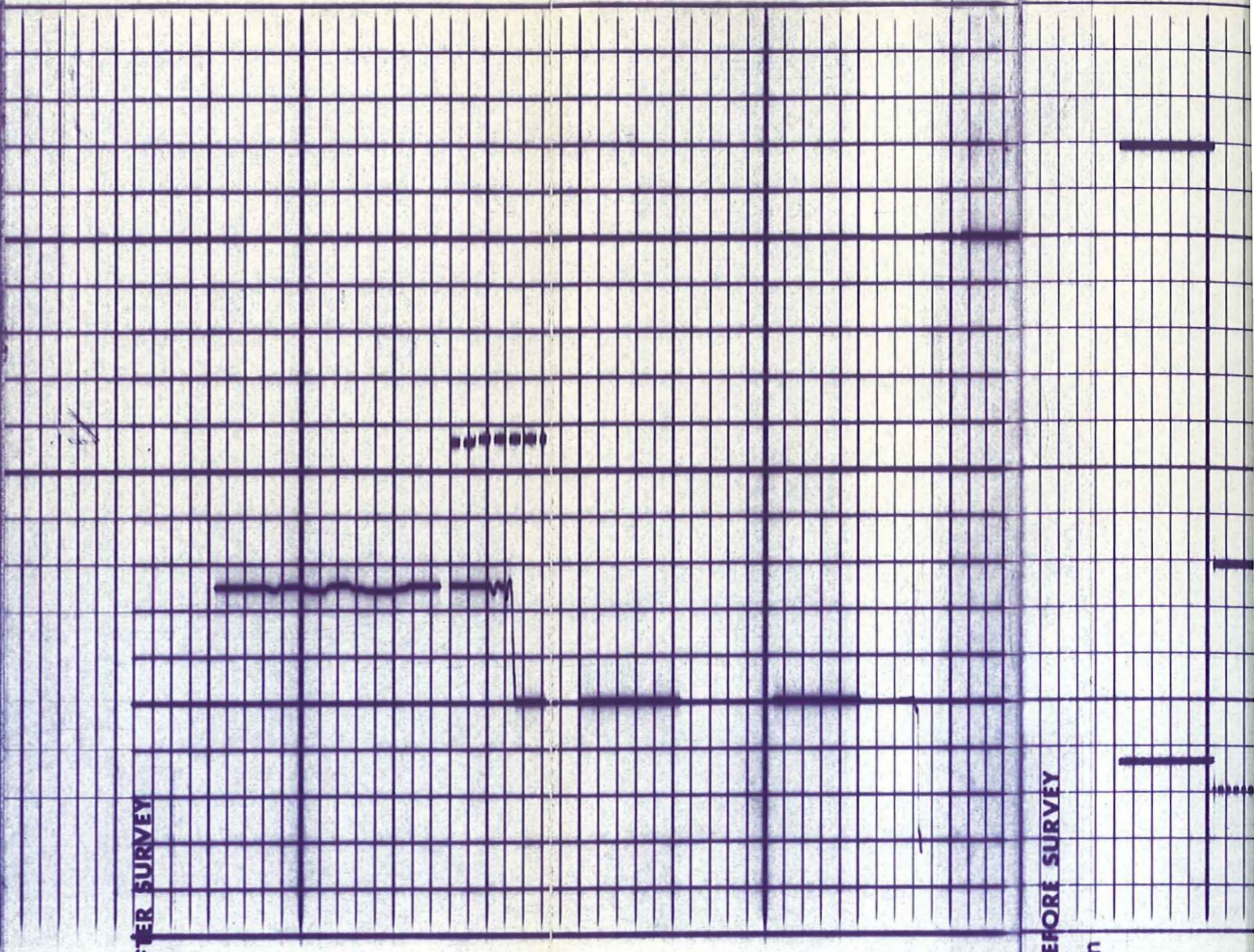
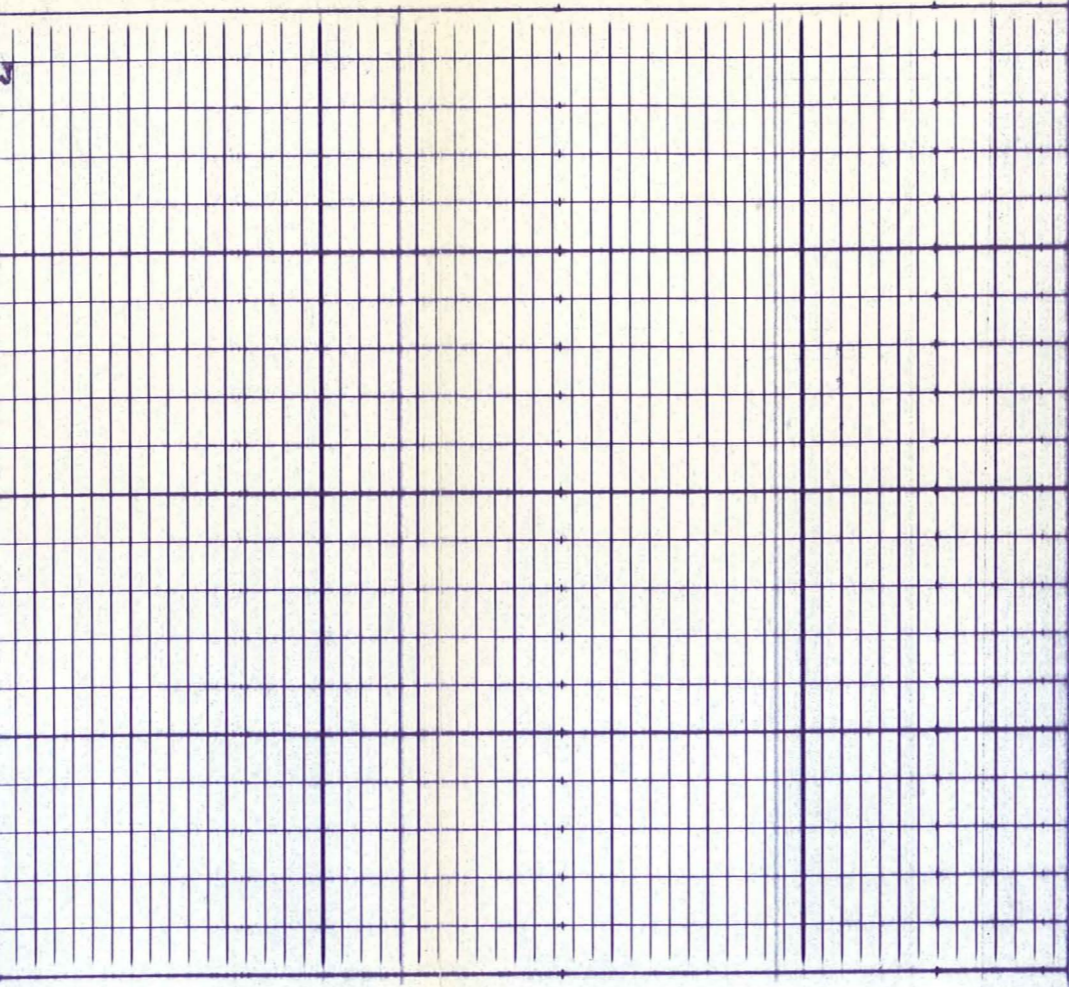
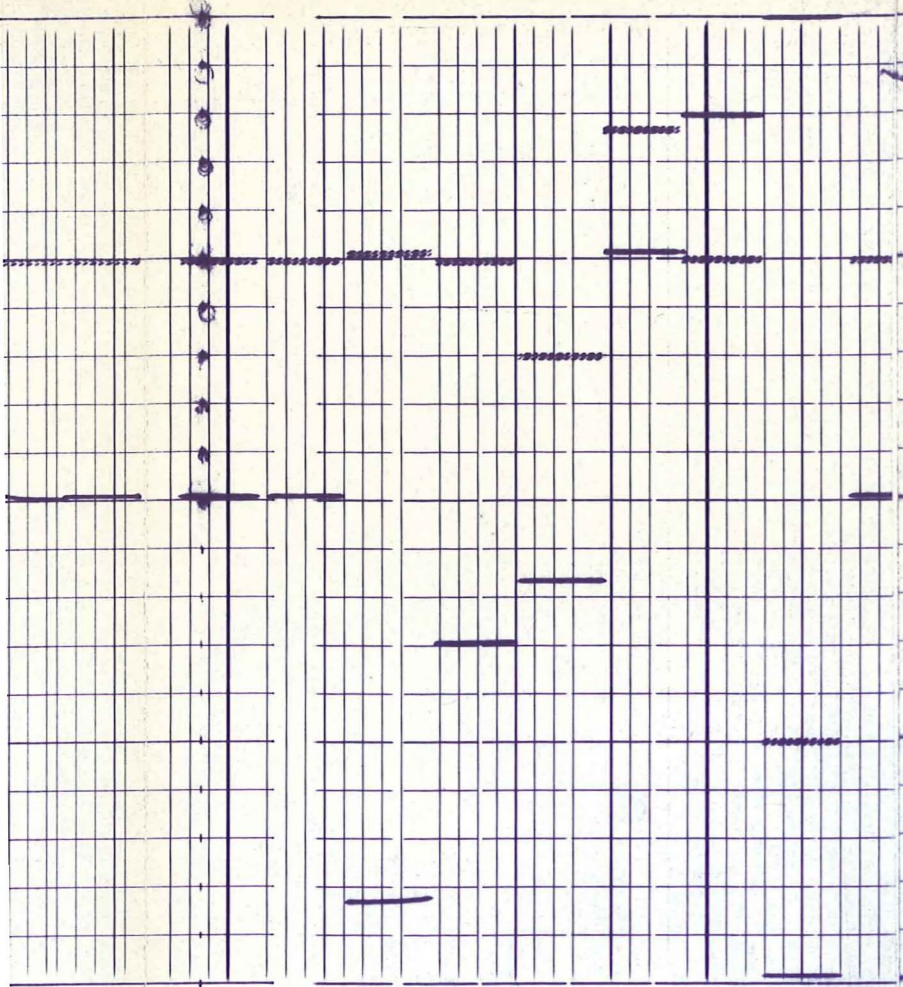
8

7

6

5





10

9

8

7

6

5

4

3

2

Run 1

Run 2

6

5

3

1

CALIBRATION AFTER SURVEY  
Neutron

8

7

2

1

CALIBRATION BEFORE SURVEY  
Neutron

6

Run 1



G. R. SURFACE CALIBRATION



Run 2

2

1

CALIBRATION BEFORE SURVEY

Neutron

6

5

4

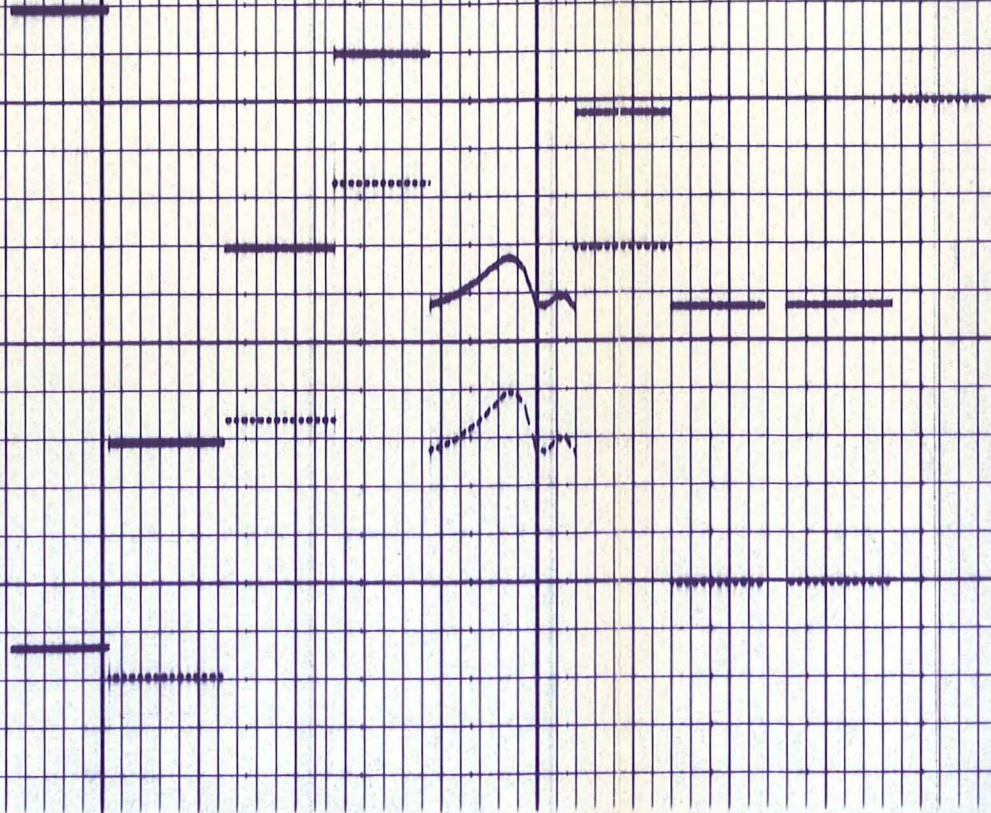
3

8

7

2

1



CALIBRATION AFTER SURVEY

Density

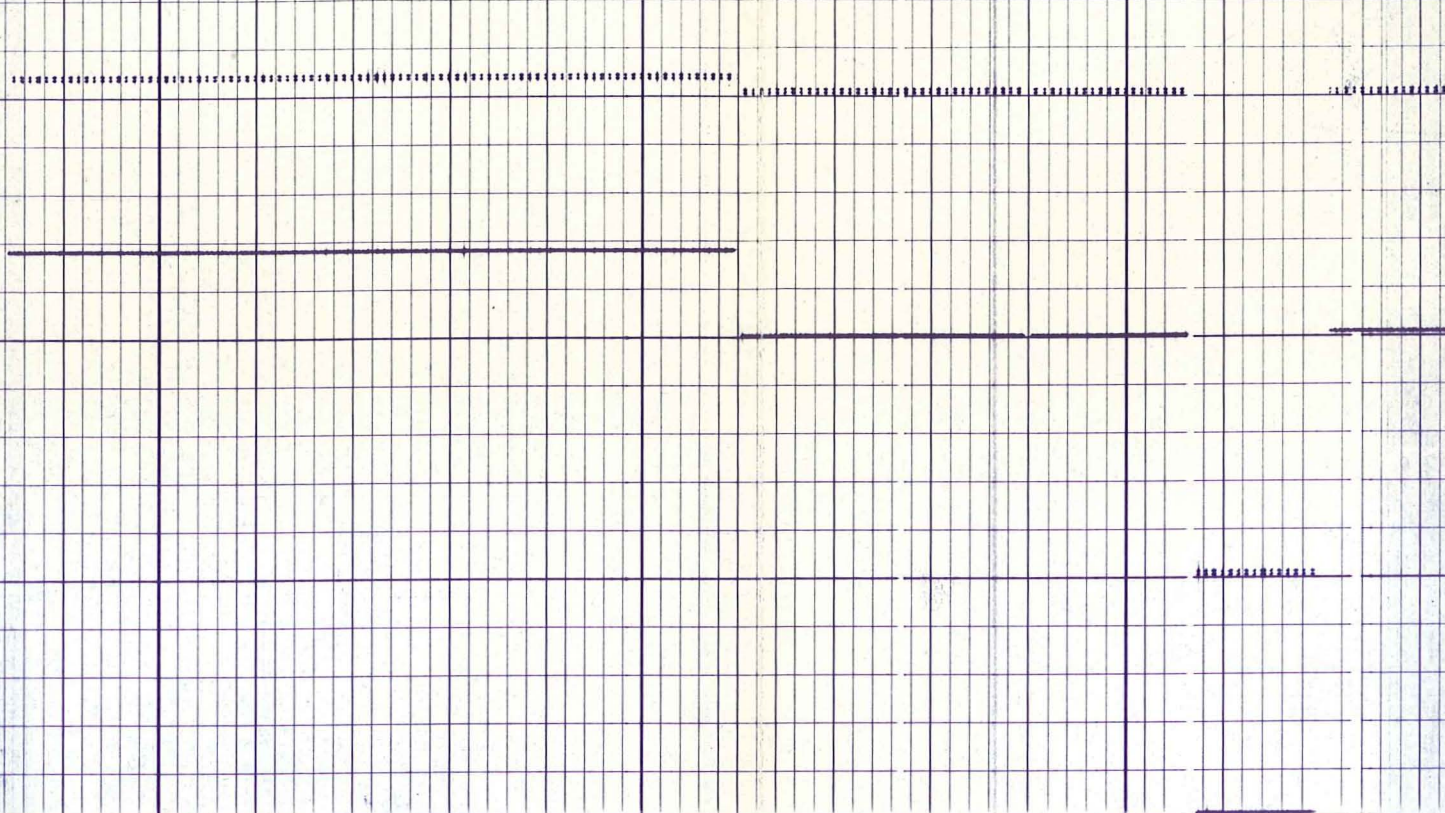
13

12

11

2

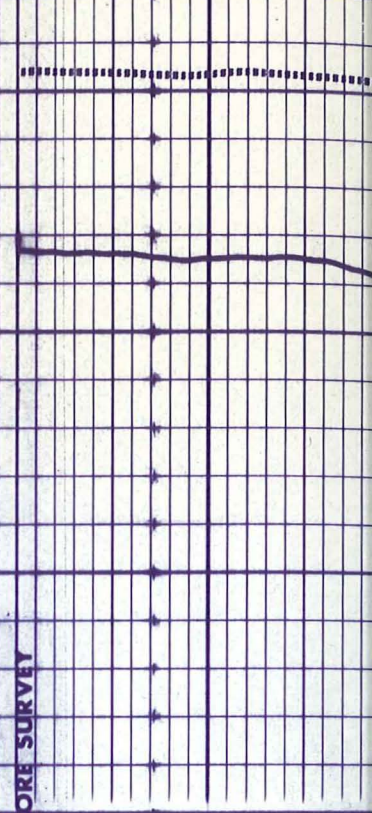
1



CALIBRATION BEFORE SURVEY

Density

13



CALIBRATION BEFORE SURVEY

Density

13

12

11

2

1

10

9

8

7

6

5

4

3

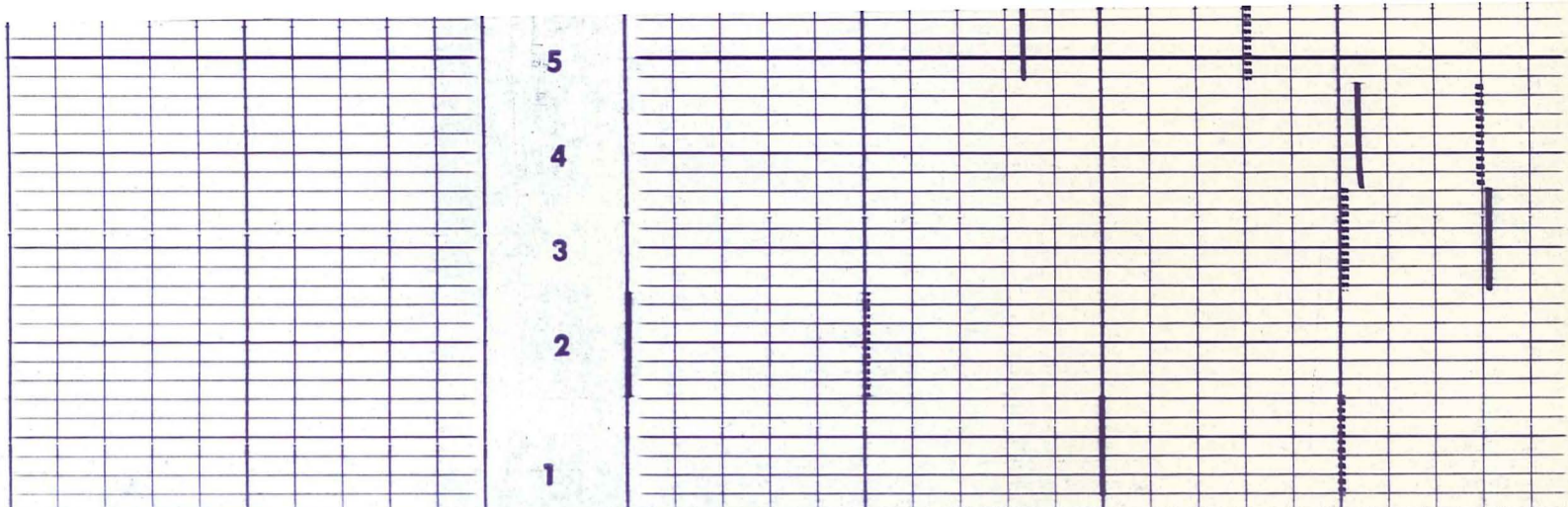
2

1

COMPENSATED NEUTRON CALIBRATION CODING

P A N E L  T E S T	1.	MECHANICAL ZERO					
	2.	RECORDED SENSITIVITY (THRU MEMORIZER IF USED)					
		RATIO	OH POROSITY			CH POROSITY	
			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	31.3	36.0	25.2	29.1	24.1
	6.	4	52.2	61.4	53.0	52.2	45.2
	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	
		2.17					
		RATIO (NORMALIZED) = RATIO (NCT-B) RATIO LOG					





COMPENSATED NEUTRON CALIBRATION CODING

		1.	MECHANICAL ZERO						
		2.	RECORDED SENSITIVITY (THRU MEMORIZER IF USED)						
P A N E L	T E S T		RATIO		OH POROSITY		CH POROSITY		
			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	31.3	36.0	25.2	29.1	24.1	
		6.	4	52.2	61.4	53.0	52.2	45.2	
		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		
			2.17						
			RATIO (NORMALIZED) =		RATIO (NCT-B)	RATIO LOG			

FORMATION DENSITY COMPENSATED CALIBRATION CODING

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

GAMMA RAY CALIBRATION CODING

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

CALIBRATION RECORD

COMPANY AEROJET NUCLEAR - INEL

WELL RRGE #1

FIELD RAFT RIVER GEOTHERMAL

COUNTY CASSIA STATE IDAHO

SCHL. FR 4992

SCHL. TD 5002

DRLR TD 5007

Elev: KB ----

DF ----

GL 4835