

GL02610

Schlumberger

**BOREHOLE COMPENSATED
SONIC LOG**

COUNTY CASSIA
FIELD or LOCATION RRGE #1
WELL RAFT RIVER GEOTHERMAL
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
Sec. 23 Twp. 15S Rge. 26E

Other Services:
DIL CBL
CNL-FDC-GR
TEMP. CAL.

Permanent Datum: GL Elev.: 4835
Log Measured From: GL Ft. Above Perm. Datum
Drilling Measured From: GL

Elev.: K.B.
D.F.
G.L. 4835

| | | | |
|---------------------|------------------|------------------|------------------|
| Date | 1-9-75 | 2-2-75 | 4-6-75 |
| Run No. | ONE | TWO | THREE |
| Depth-Driller | 900 | 4632 | 5007 |
| Depth-Logger | 900 | 4620 | 5000 |
| Btm. Log Interval | 896 | 4618 | 4998 |
| Top Log Interval | 30 | 880 | 3592 |
| Casing-Driller | 30" @ 40 | 20 @ 900 | 13-3/8@3624 |
| Casing-Logger | 44 | 900 | 3623 |
| Bit Size | 26" | 12-1/4 | 12-1/4 |
| Type Fluid in Hole | FGM/LIME | WATER | WATER(FDRM) |
| Dens. Visc. | 9.1 50 | --- | --- |
| pH Fluid Loss | 10.5 | --- | --- |
| Source of Sample | PIT | PIT | FLOWING |
| Rm @ Meas. Temp. | 4.13 @ 67 °F | 6.2 @ 54 °F | 2.41 @ 114 °F |
| Rmf @ Meas. Temp. | 3.4 @ 65 °F | --- | --- |
| Rmc @ Meas. Temp. | 6.3 @ 67 °F | --- | --- |
| Source: Rmf Rmc | M C | --- | --- |
| Rm @ BHT | 2.55 @ 109 °F | 1.35 @ 52 °F | 0.9 @ 286 °F |
| Circulation Stopped | 0500 1-9 | 2:30AM 2-2 | WELL |
| LOG ON BTM. | 1100 1-9 | 2:30PM 2-2 | FLOWING |
| Max. Rec. Temp. | 109 °F | 264 °F | 286 °F |
| Equip. Location | 7710 R. S. PARKS | 7710 R. S. PARKS | 8002 R. S. PARKS |
| Recorded By | PARKS | PARKS | PARKS |
| Witnessed By | STOKER | STOKER | MILLER |

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

| | | | |
|-------------------|-------|-------|-------|
| Run No. | ONE | TWO | THREE |
| Service Order No. | 23851 | 23855 | 23967 |
| Fluid Level | FULL | FULL | FULL |

| SCALE CHANGES | | | |
|---------------|-------|---------------|-----------------|
| Type Log | Depth | Scale Up Hole | Scale Down Hole |
| | | | |

| EQUIPMENT DATA | | | |
|-------------------|--------|--------|------|
| Sonic Panel No. | JH-131 | JD-357 | 128 |
| Sonic Cart No. | DB-494 | E-494 | 148 |
| Sonic Sonde No. | H-429 | H-424 | 160 |
| Mem. Panel No. | AC-215 | AC-221 | 207 |
| G.R. Cart. No. | D-117 | H-268 | --- |
| G.R. Panel No. | AC-215 | AC-221 | --- |
| Caliper No. | --- | 2653 | 2653 |
| TTR No. | --- | E-1826 | 1826 |
| Centralizers: No. | --- | 1 | 1 |
| Type | --- | VCD | VCD |
| Standoffs: No. | 1 | 1 | NONE |
| Type | 4 FIN | 4 FIN | --- |
| Time Const.-Sec. | 2 | 1 | --- |
| Speed - F.P.M. | 30 | 60 | 30 |

| LOGGING DATA | | | | | |
|---------------------------|-----|----|---------|-------|----|
| Porosity Selectors | | | | Depth | |
| Δtm | Δtf | Cp | φ Scale | From | To |
| NOT RUN ON ALL THREE RUNS | | | | | |

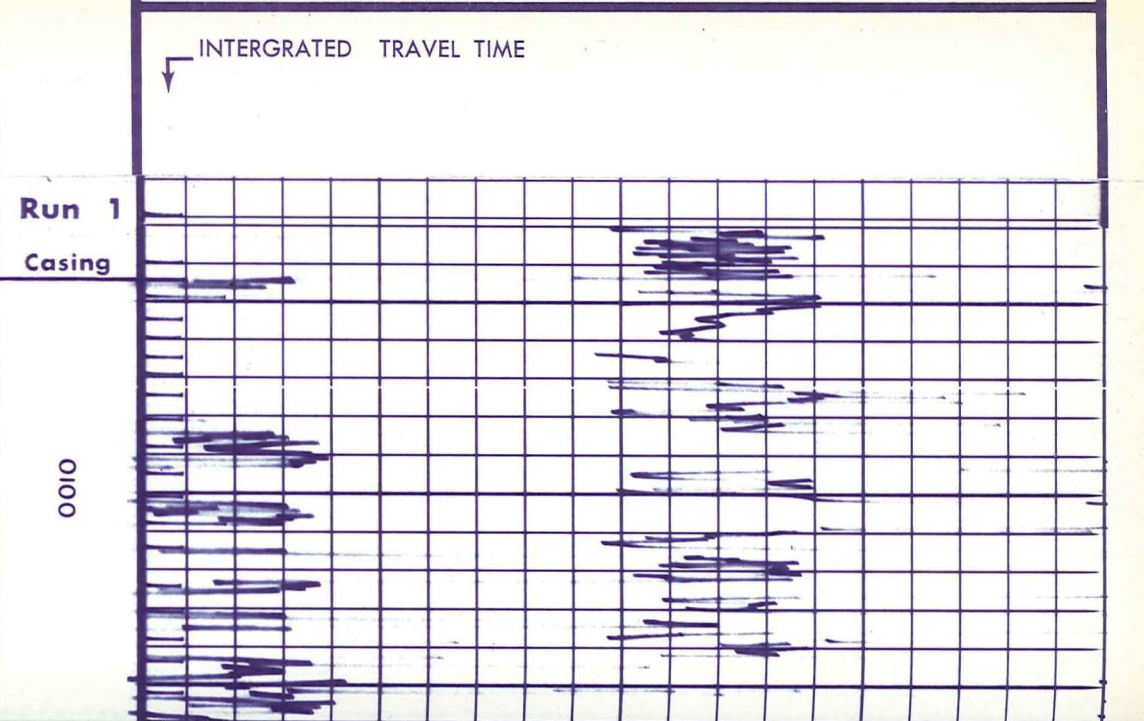
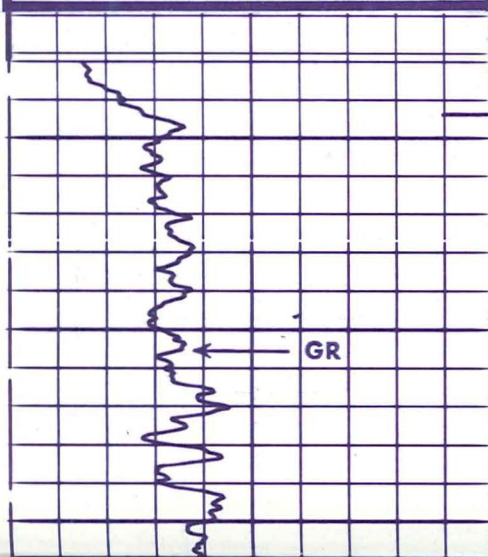
| CALIBRATION DATA | | | |
|------------------|------------|------|------|
| GR | BKG. CPS | 70 | 100 |
| | Source CPS | 460 | 460 |
| | Tc Sec | CAL. | CAL. |

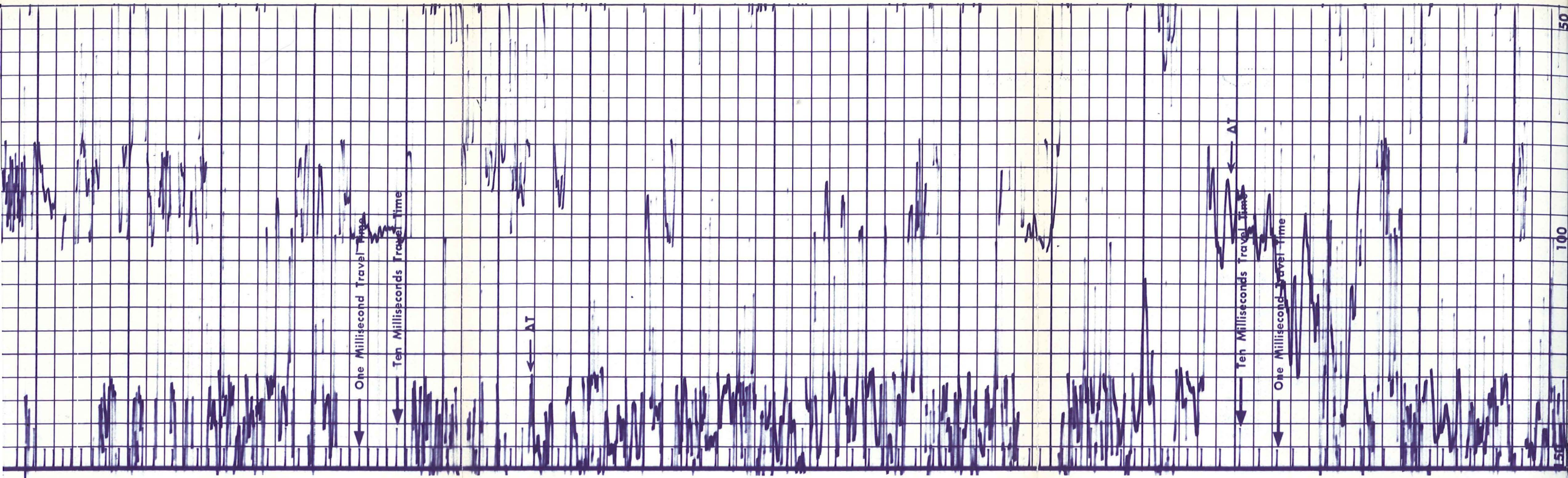
REMARKS
RUN THREE: CALIPER STUCK AT 11 1/2"
Velocity (ft/sec) = 1,000,000
Interval Transit Time (microseconds per foot)

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.

| | | |
|--------------------------------|-----|-----|
| CALIPER DIAM. IN INCHES | 0 | 150 |
| RUN ONE - NOT RUN | 150 | 300 |

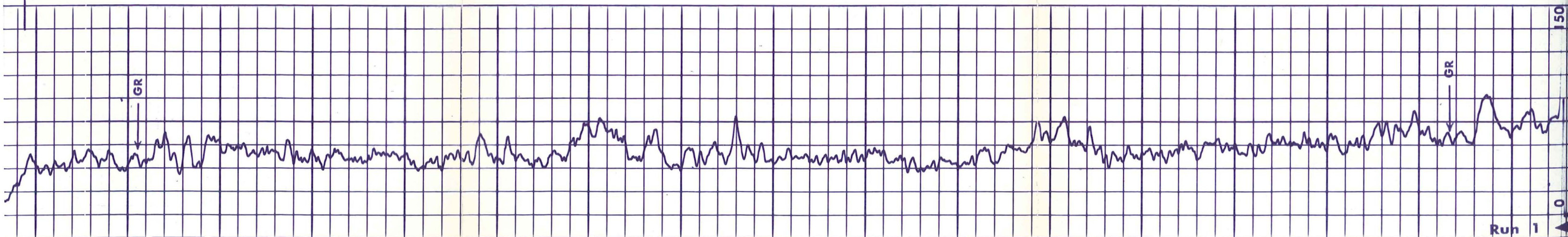
| | | |
|-------|--|--|
| DEPTH | INTERVAL TRANSIT TIME MICROSECONDS PER FOOT | T ₃ R ₁ 2 R ₂ 2 |
| | 150 | 100 |
| | 250 | 200 |
| | | 50 |
| | | 150 |



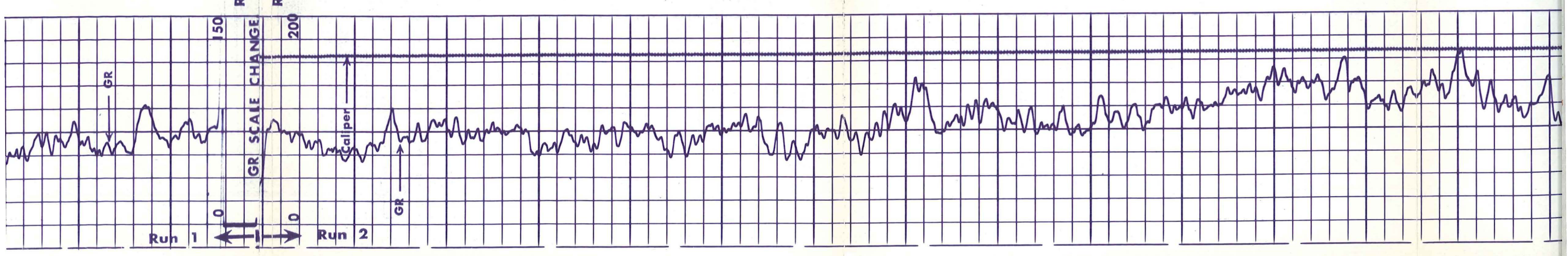
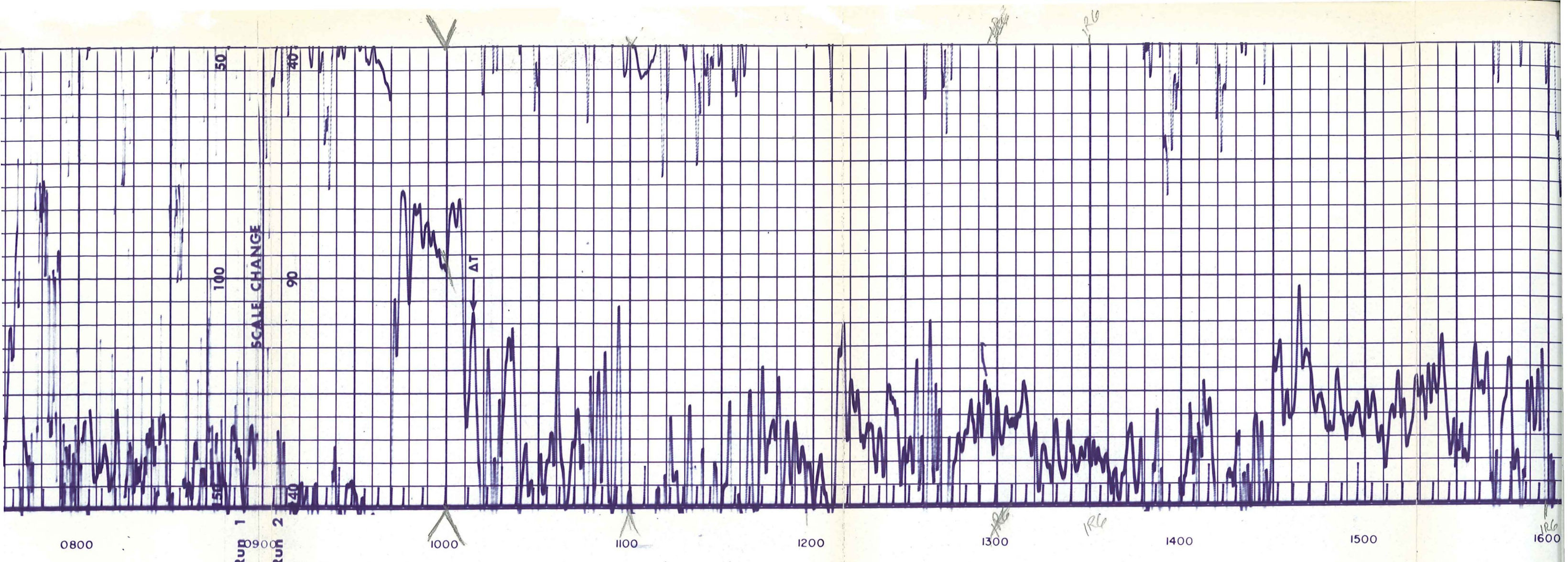


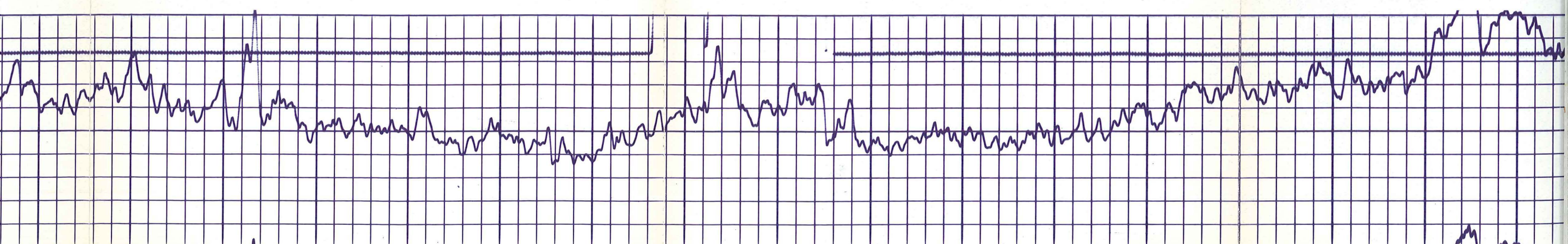
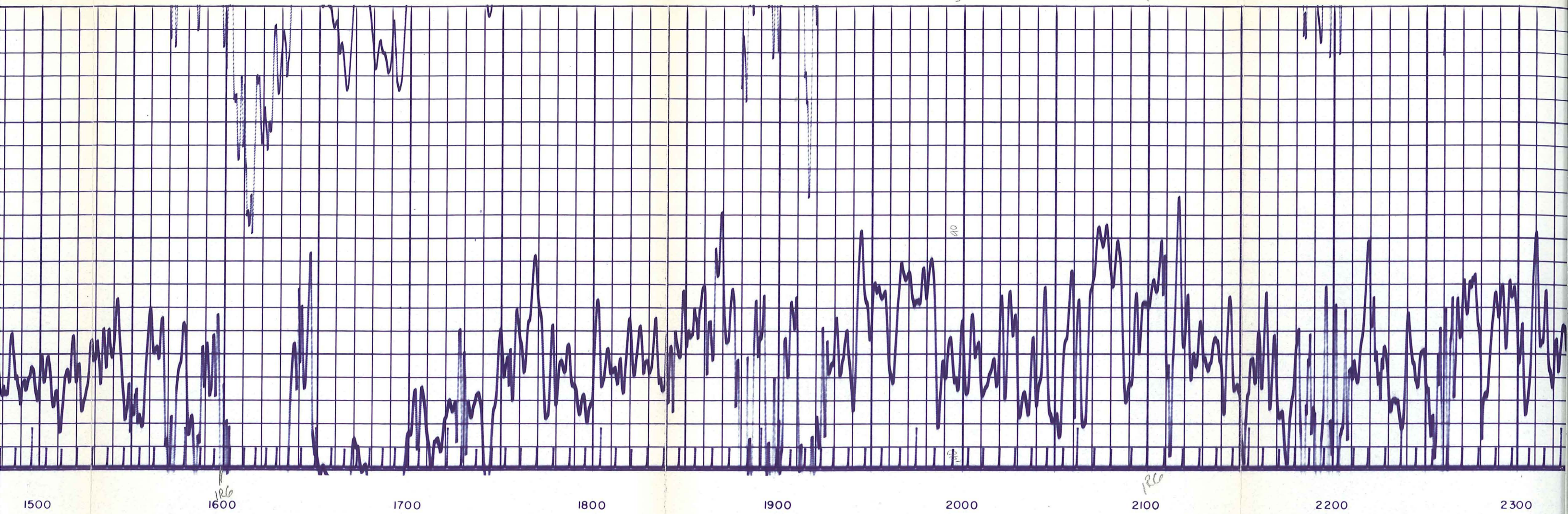
Casing

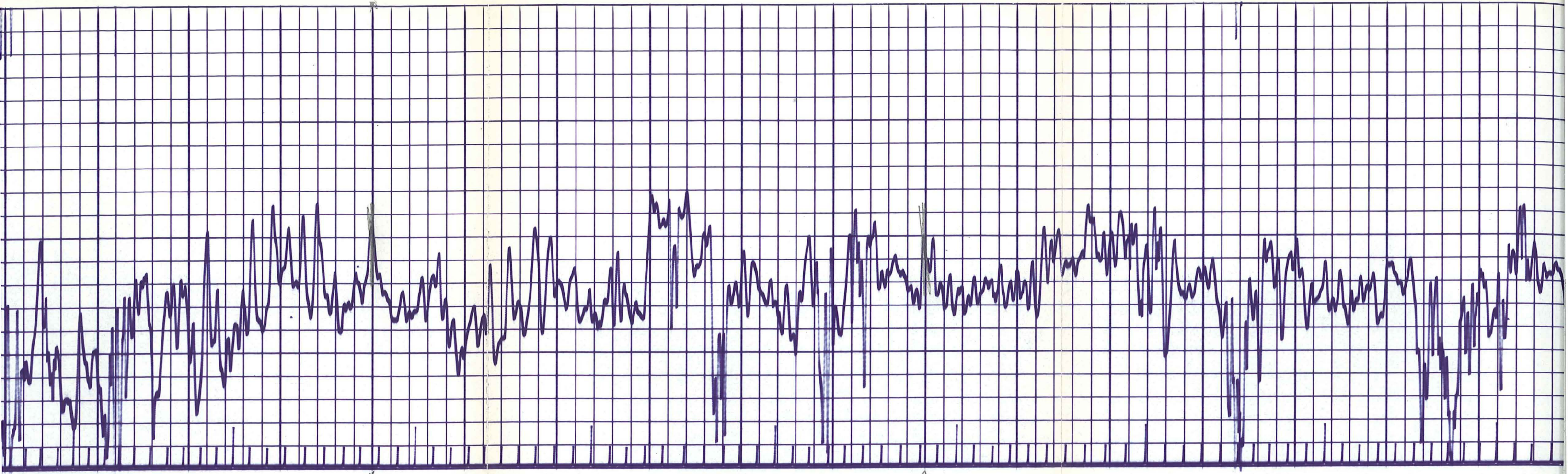
0100 0200 0300 0400 0500 0600 0700 0800



Run 1







100

2300

2400

2500

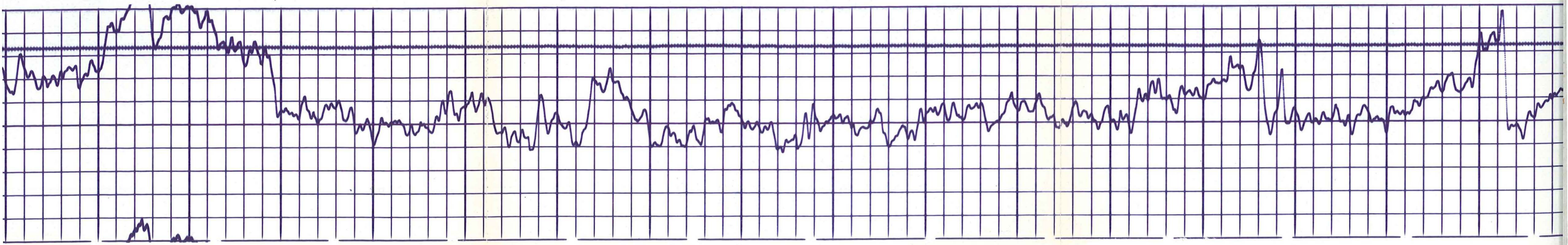
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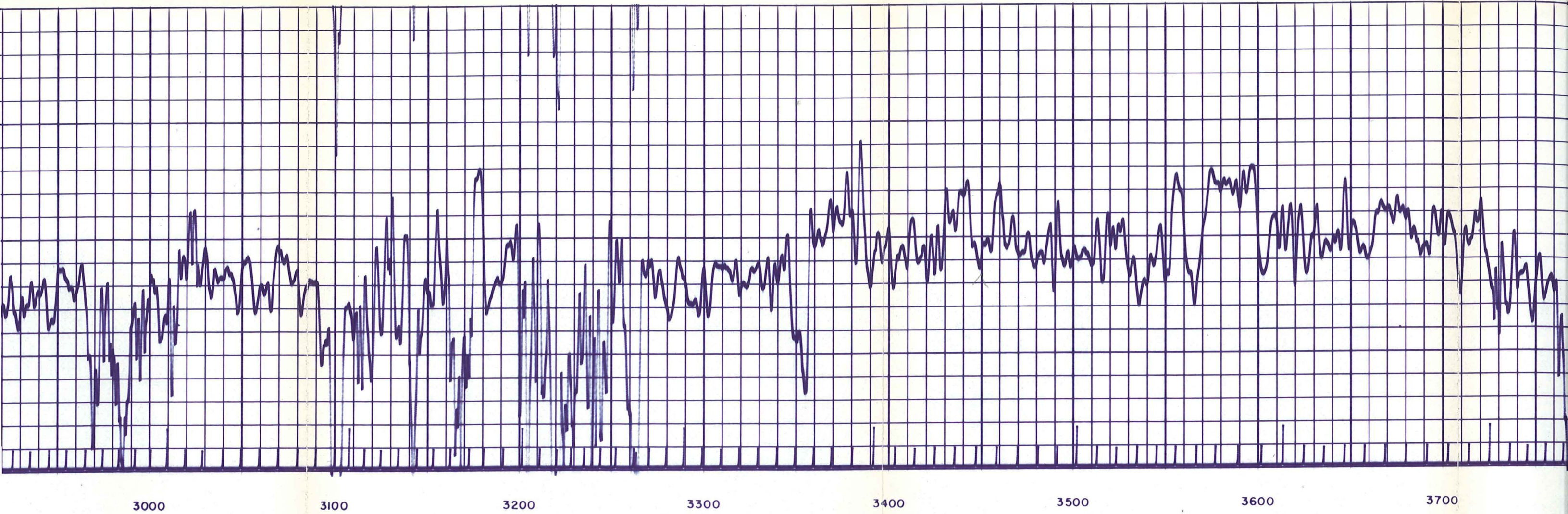
2700

2800

2900

3000





3000

3100

3200

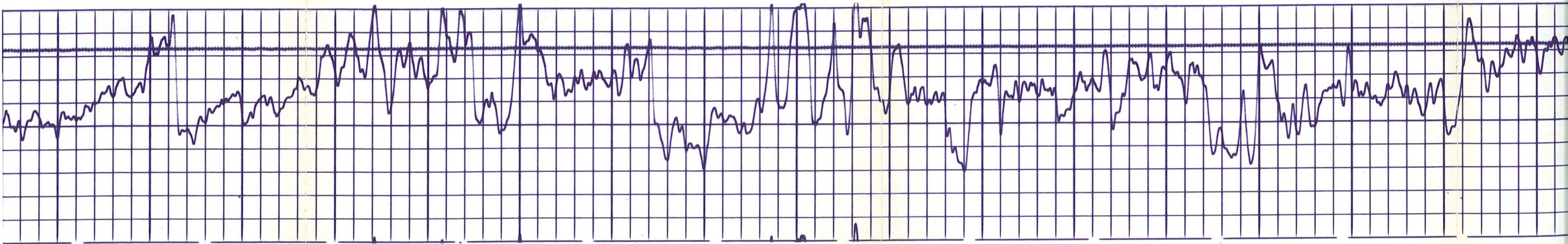
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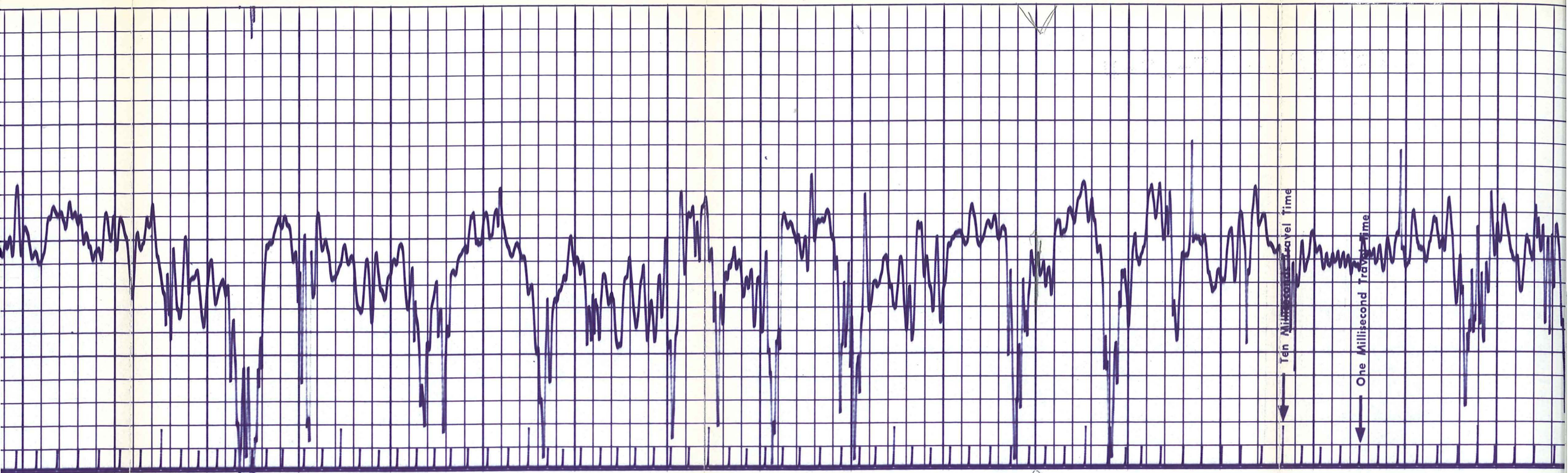
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3500

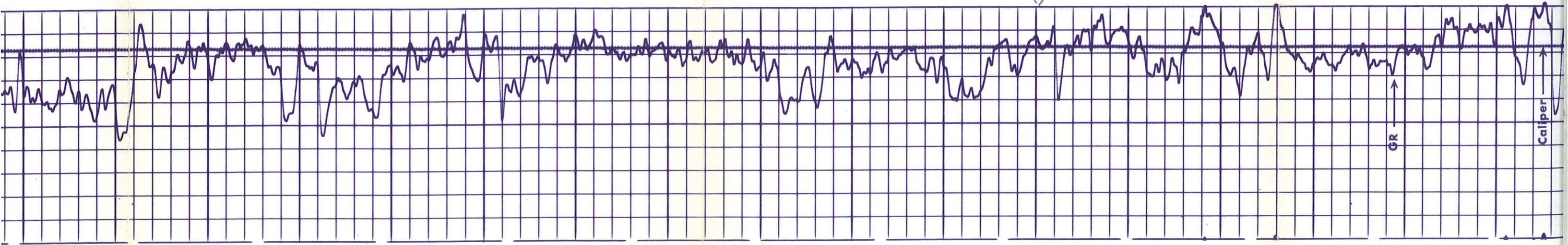
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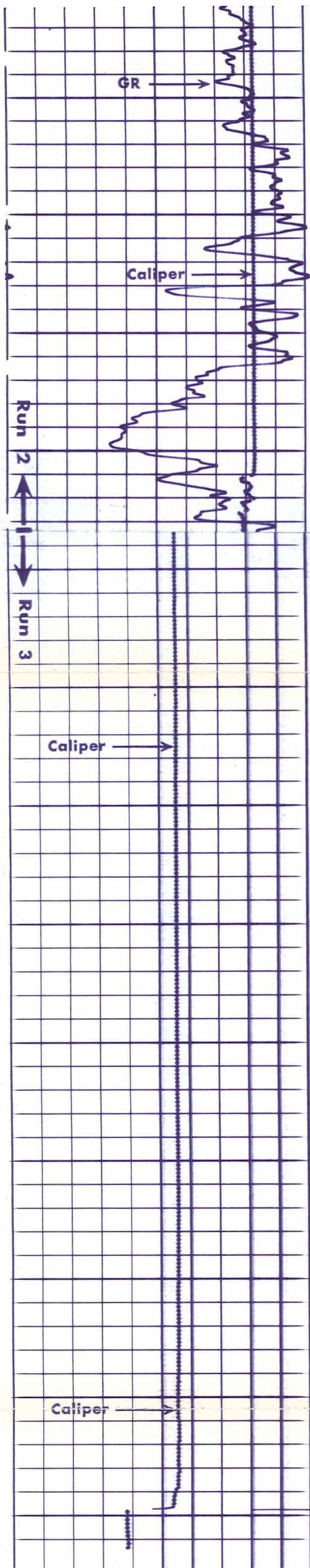
3700



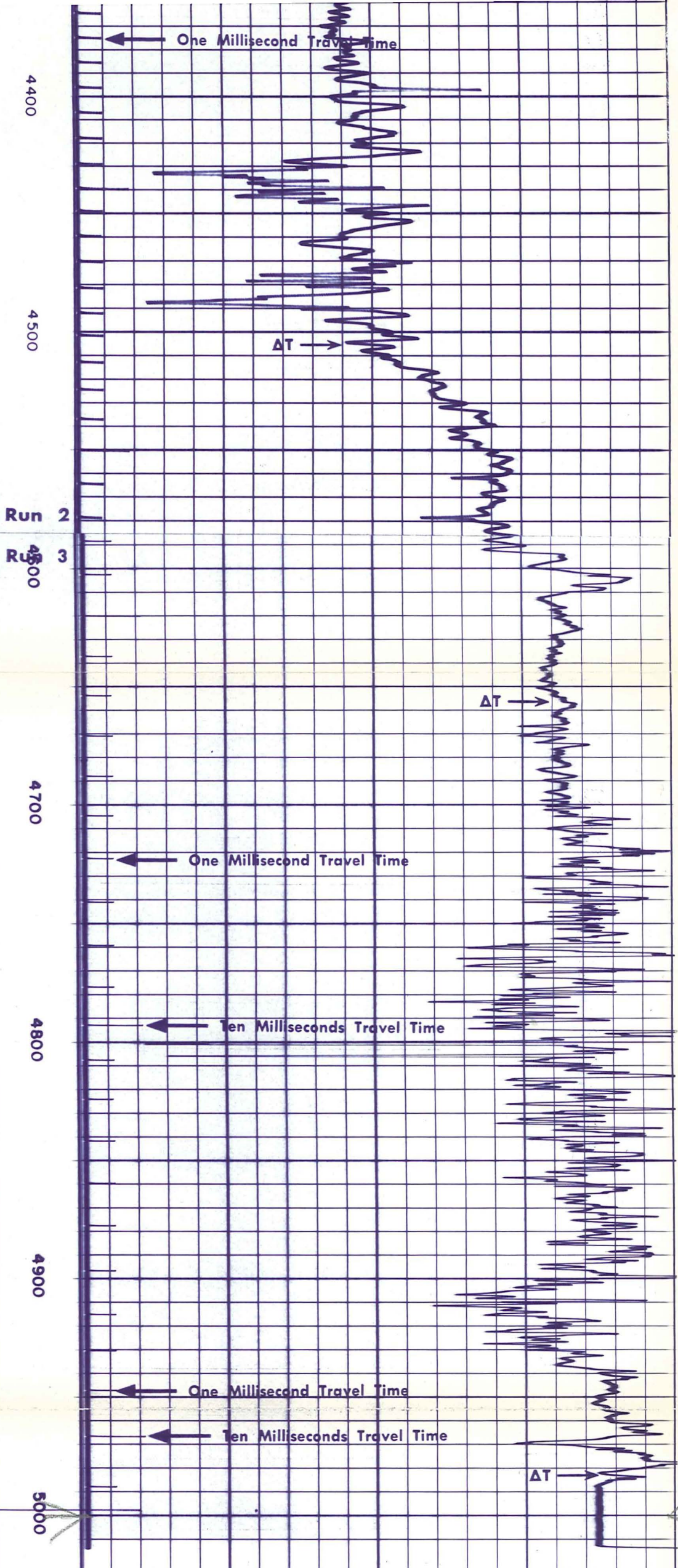


3700 3800 3900 4000 4100 4200 4300 4400





| | |
|--------------------------------|----|
| GAMMA RAY API UNITS | |
| RUN THREE - NOT RUN | |
| CALIPER DIAM. IN INCHES | |
| 6 | 16 |
| NOTE REMARKS | |



| | |
|--|--------------------------------------|
| INTERGRATED TRAVEL TIME (RECORDED 9' DEEP) | |
| INTERVAL TRANSIT TIME MICROSECONDS PER FOOT | |
| | T. 3 R ₁ 2 R ₂ |
| 140 | 90 40 |
| 240 | 190 140 |

| | |
|--------------------------------|-----|
| CALIPER DIAM. IN INCHES | |
| RUN ONE - NOT RUN | |
| GAMMA RAY API UNITS | |
| 0 | 150 |
| 150 | 300 |

| | |
|--|--------------------------------------|
| DETAIL LOG 5" = 100' | |
| INTERVAL TRANSIT TIME MICROSECONDS PER FOOT | |
| | T. 3 R ₁ 2 R ₂ |
| 150 | 100 50 |
| 250 | 200 150 |
| INTERGRATED TRAVEL TIME | |

| | |
|--------------|----|
| 6 | 16 |
| NOTE REMARKS | |

| | | | |
|-------|-----|-----|-----|
| DEPTH | 140 | 90 | 40 |
| | 240 | 190 | 140 |

DETAIL LOG

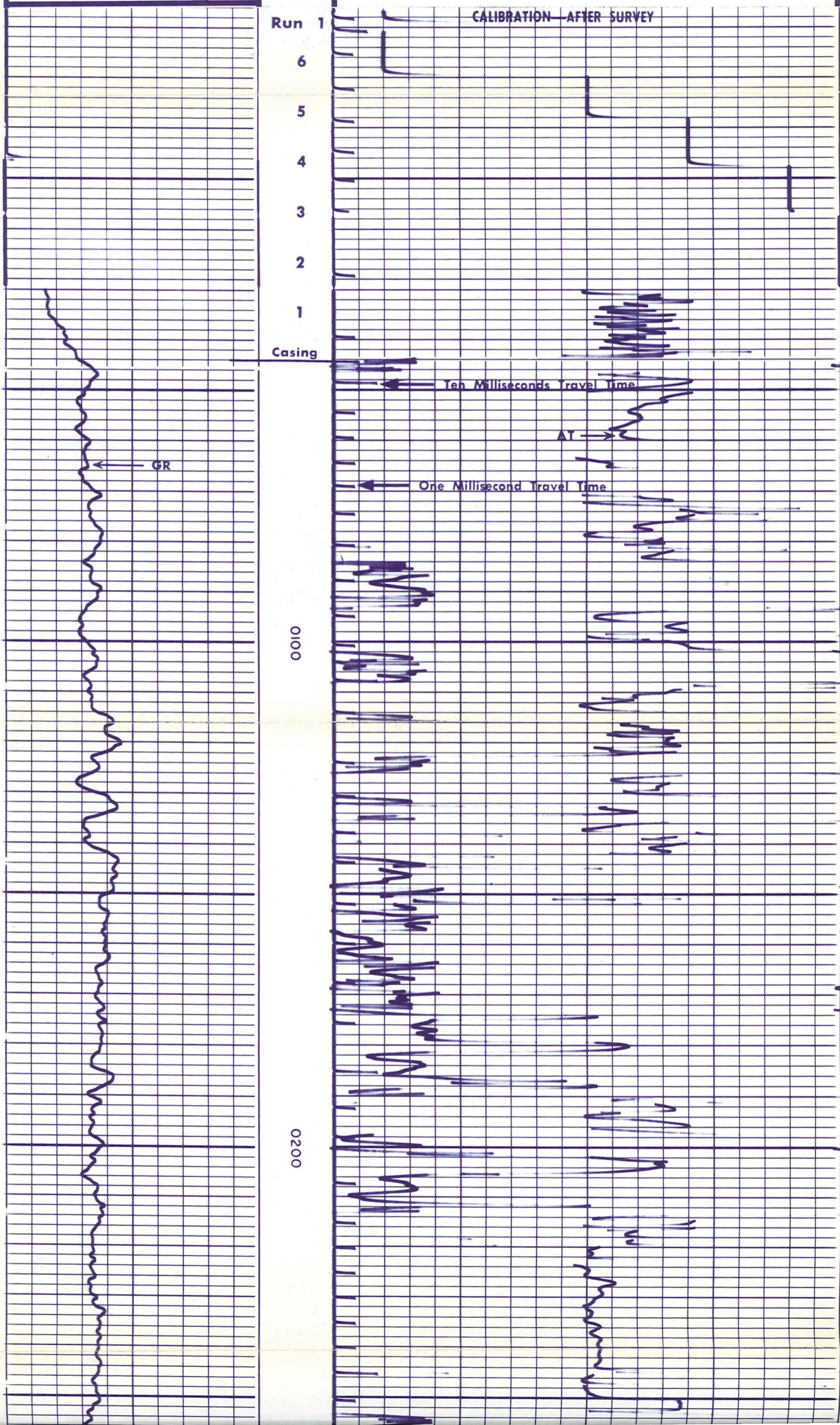
5" = 100'

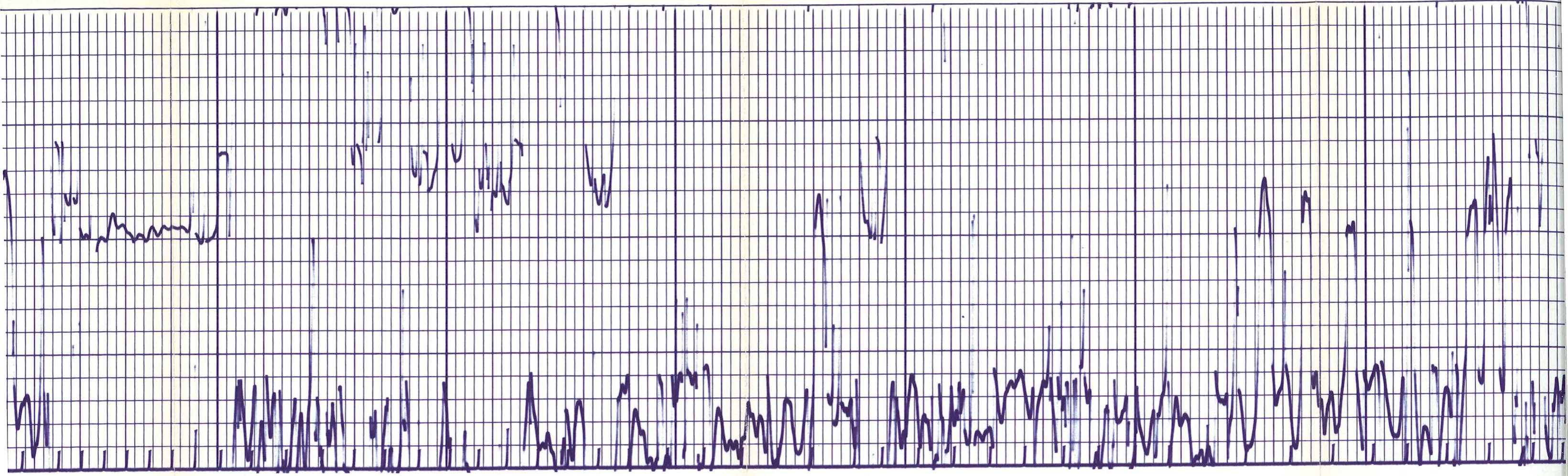
| | |
|-------------------|-----------------|
| CALIPER | DIAM. IN INCHES |
| RUN ONE - NOT RUN | |

| | |
|------------------|-----------|
| GAMMA RAY | API UNITS |
| 0 | 150 |
| 150 | 300 |

| | | | |
|-------|------------------------------|-----------------------|---|
| DEPTH | INTERVAL TRANSIT TIME | MICROSECONDS PER FOOT | T ₃ R ₁ 2R ₂ |
| 150 | | 100 | 50 |
| 250 | | 200 | 150 |

INTERGRATED TRAVEL TIME

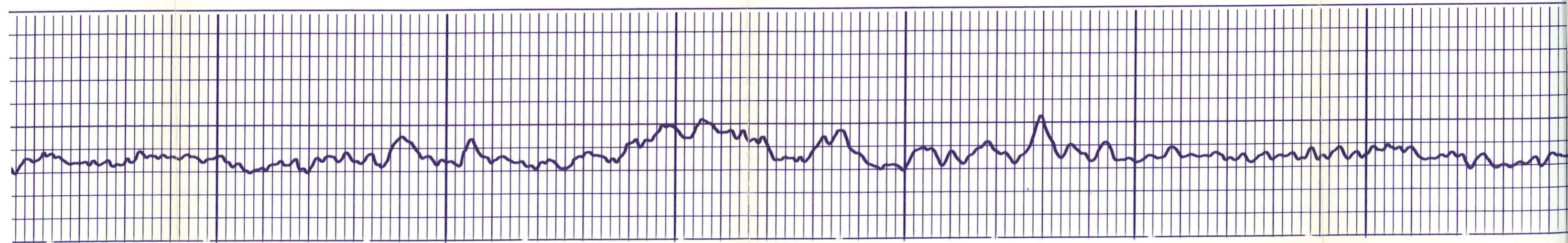


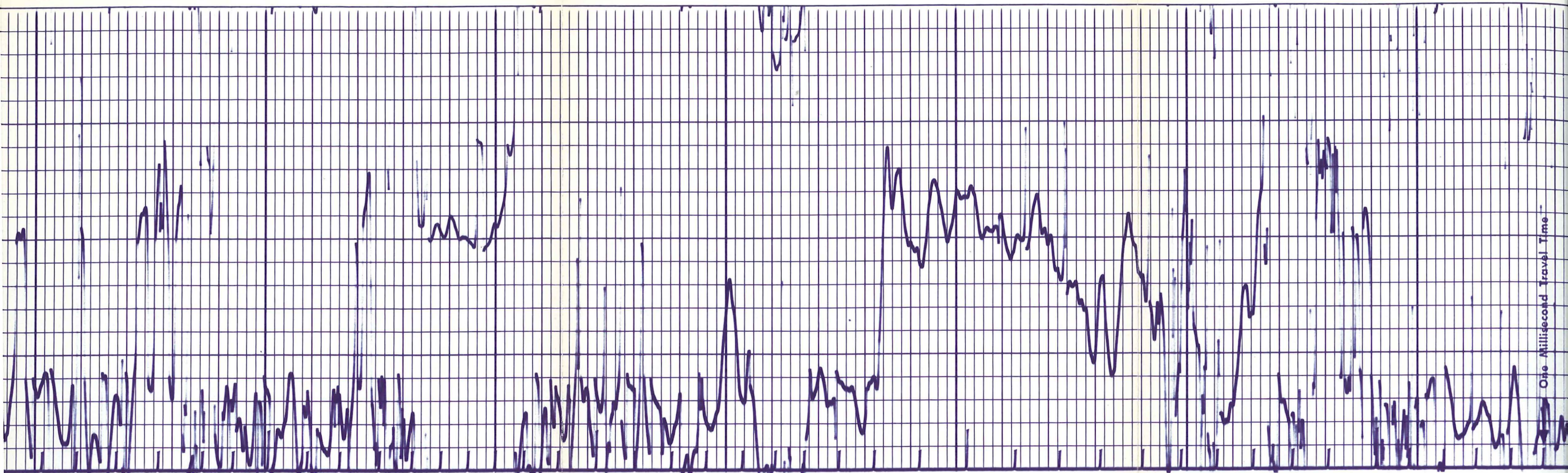


0300

0400

0500





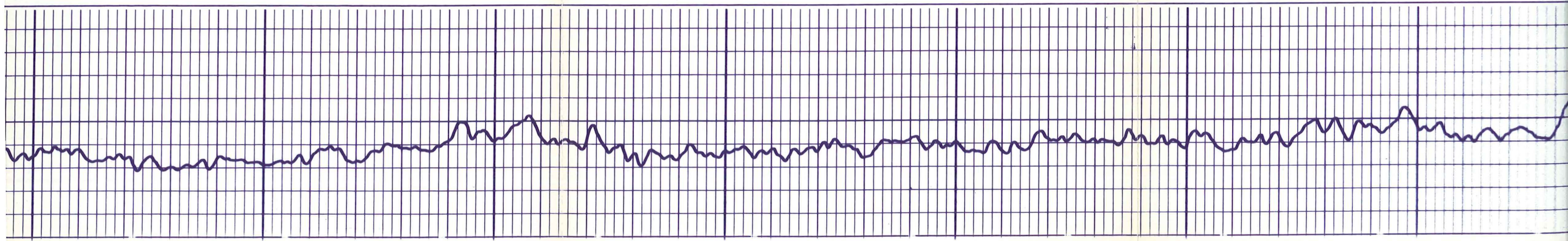
One Millisecond Travel Time

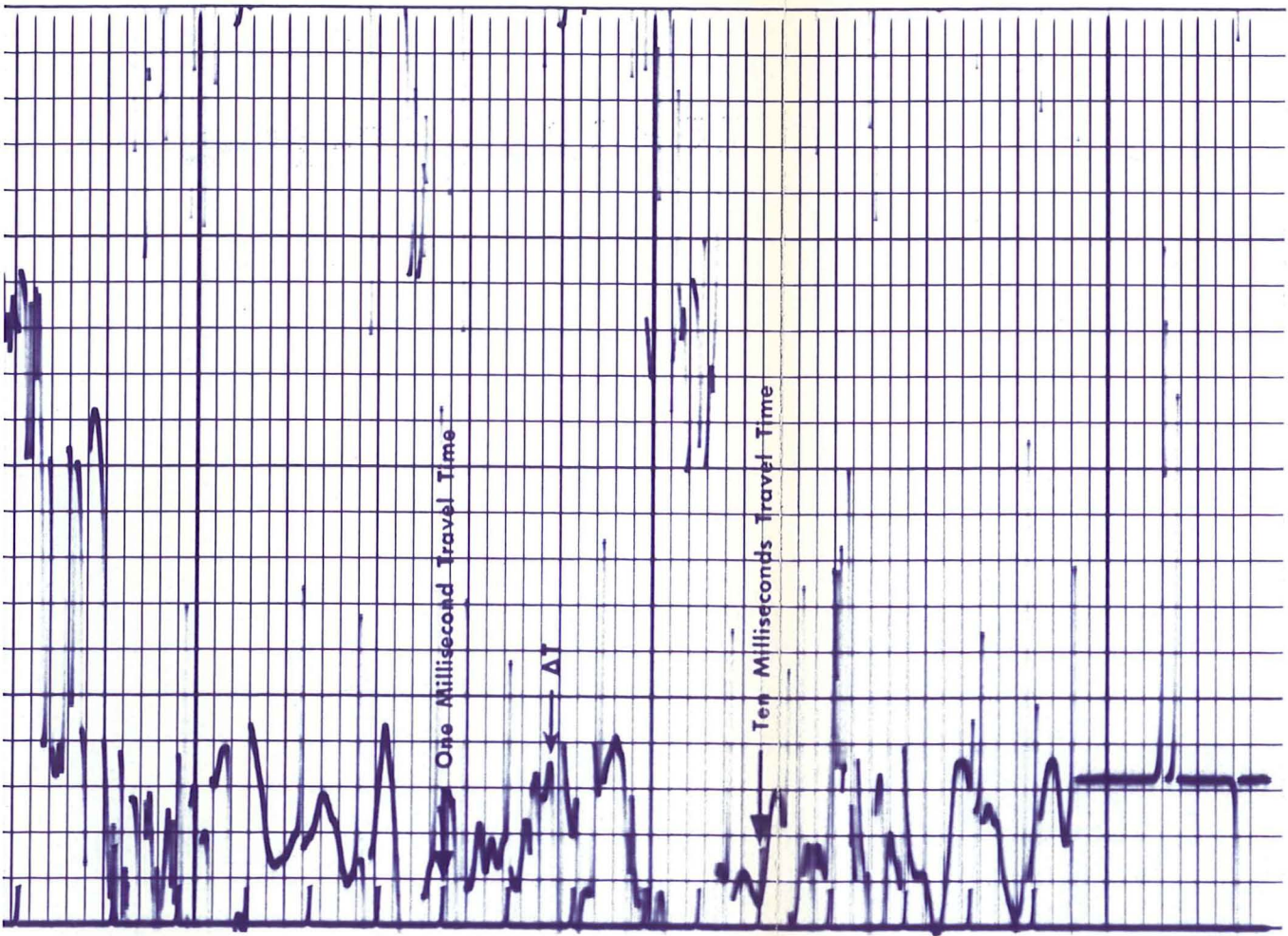
0500

0600

0700

0800

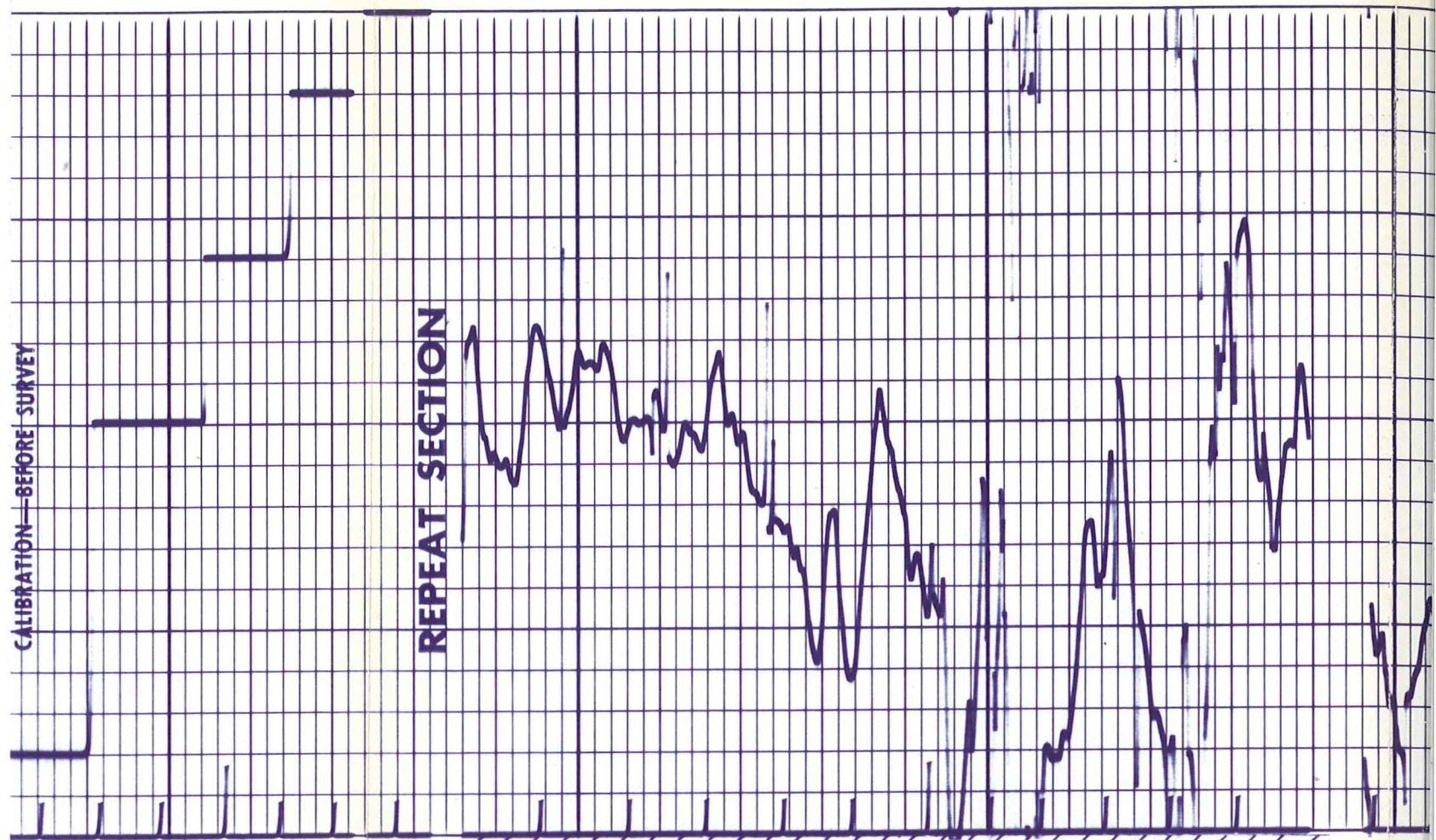
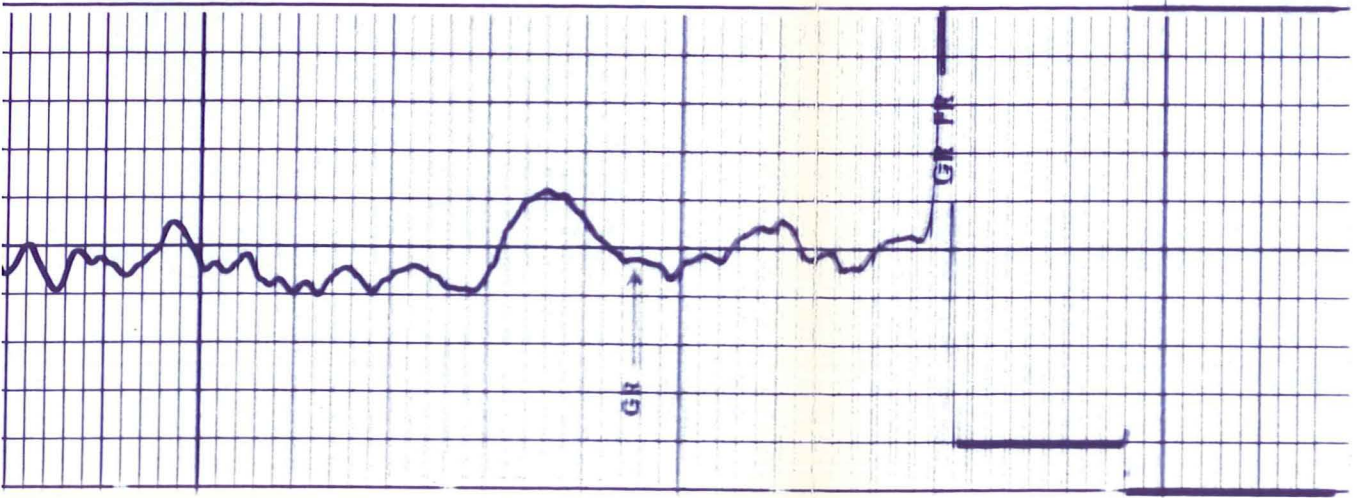




0800

0900

Run 1



Run 1

6

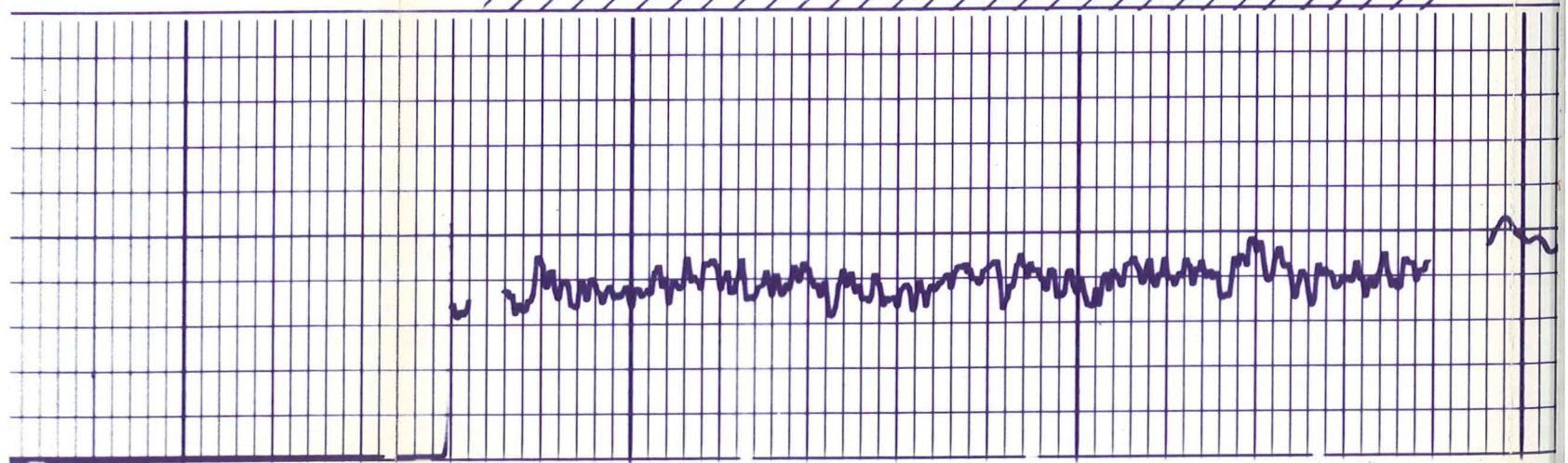
5

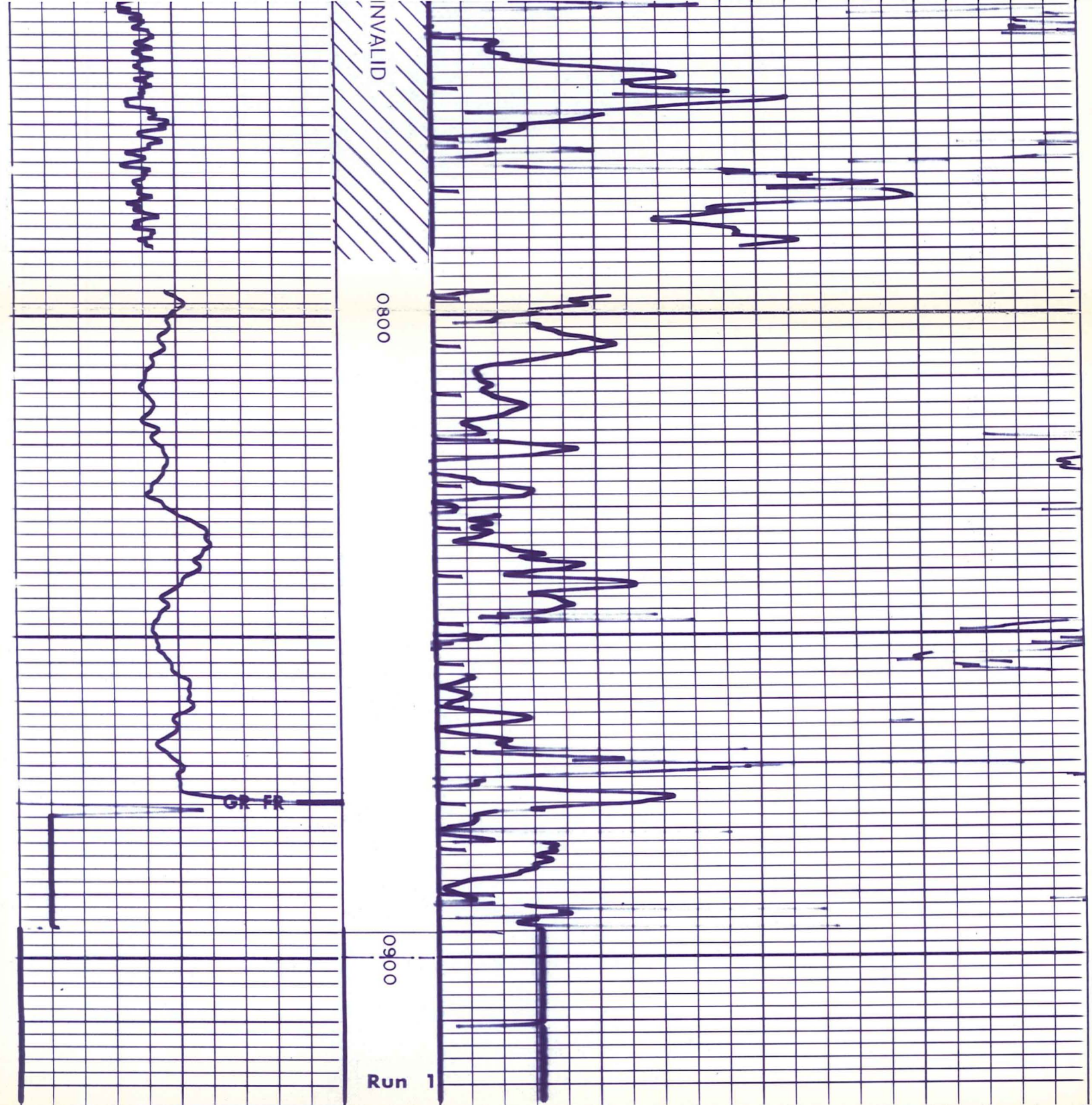
4

3

1

0800





| GAMMA RAY | | API UNITS | |
|-----------|-----|-----------|-----|
| 0 | 150 | 150 | 300 |
| 150 | | | |

| CALIPER | | DIAM. IN INCHES | |
|-------------------|--|-----------------|--|
| RUN ONE - NOT RUN | | | |

| INTERGRATED TRAVEL TIME | | |
|-------------------------|-----|-----|
| 150 | 100 | 50 |
| 250 | 200 | 150 |

| INTERVAL TRANSIT TIME | | | MICROSECONDS PER FOOT | | T ₃ R ₁ 2R ₂ | |
|-----------------------|-----|-----|-----------------------|--|---|--|
| 150 | 100 | 50 | | | | |
| 250 | 200 | 150 | | | | |

Run 1 ↑ ↓ Run 2

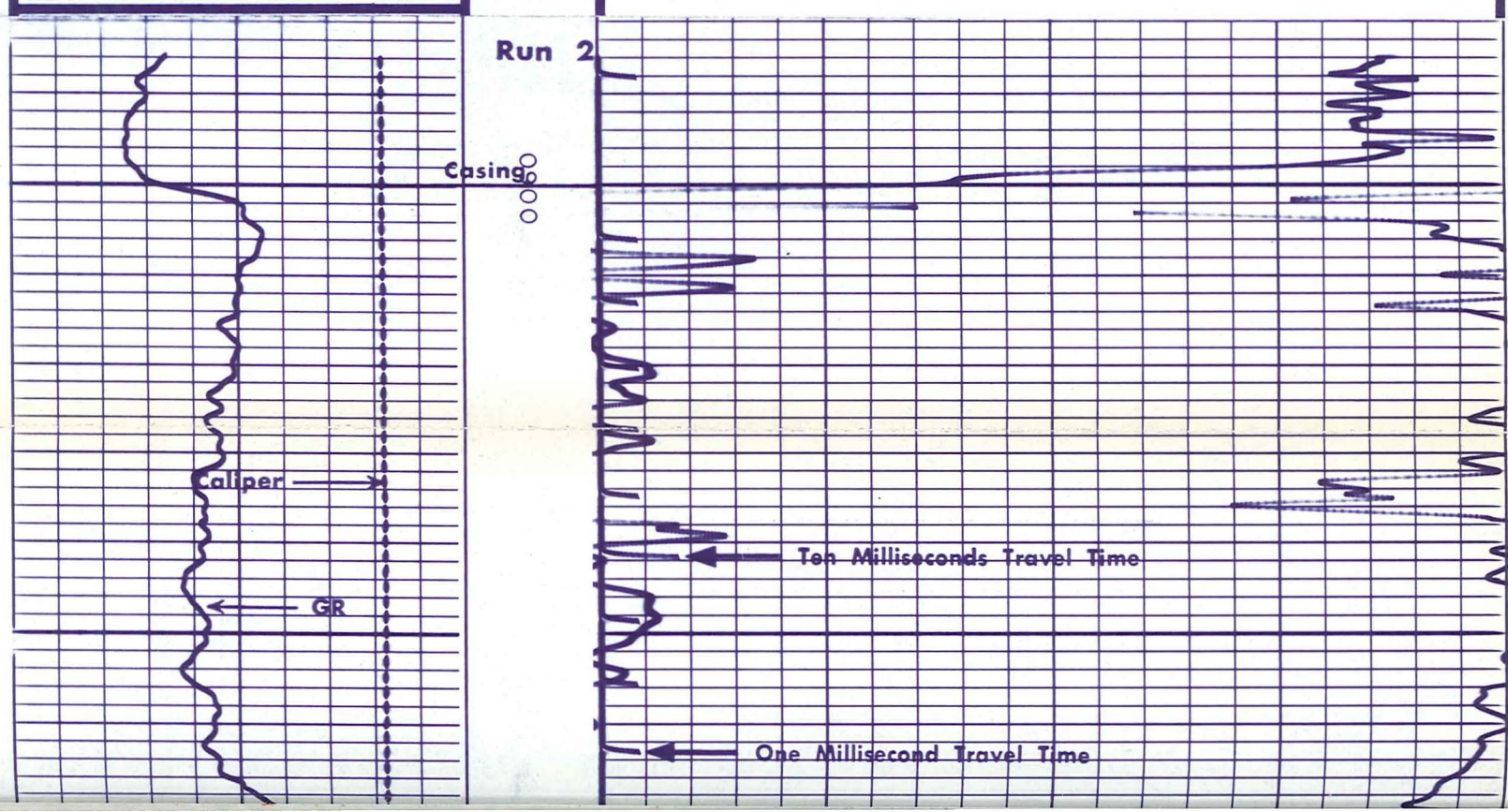
DETAIL LOG

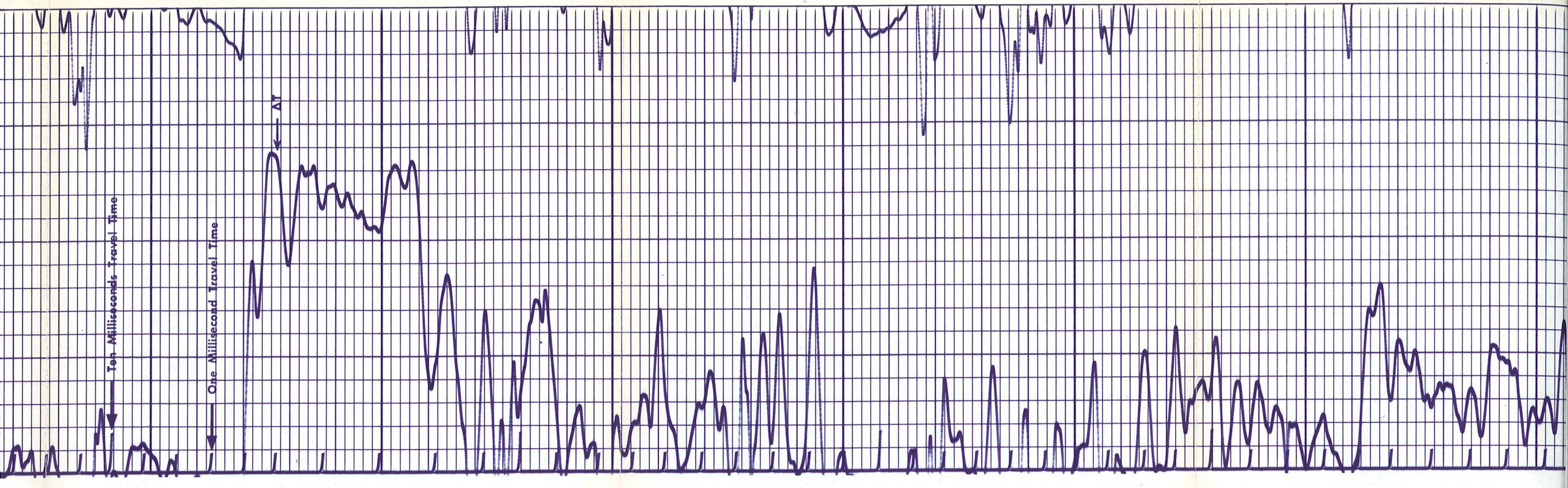
| CALIPER | | DIAM. IN INCHES | |
|---------|----|-----------------|--|
| 6 | 16 | | |

| GAMMA RAY | | API UNITS | |
|-----------|-----|-----------|-----|
| 0 | 200 | 200 | 400 |
| 200 | | | |

| INTERVAL TRANSIT TIME | | | MICROSECONDS PER FOOT | | T ₃ R ₁ 2R ₂ | |
|-----------------------|-----|-----|-----------------------|--|---|--|
| 140 | 90 | 40 | | | | |
| 240 | 190 | 140 | | | | |

INTERGRATED TRAVEL TIME
(RECORDED 7½' DEEP)

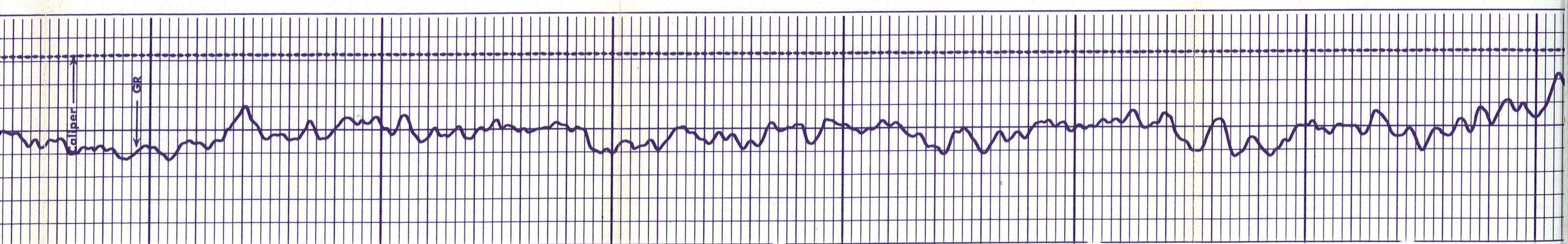




1000

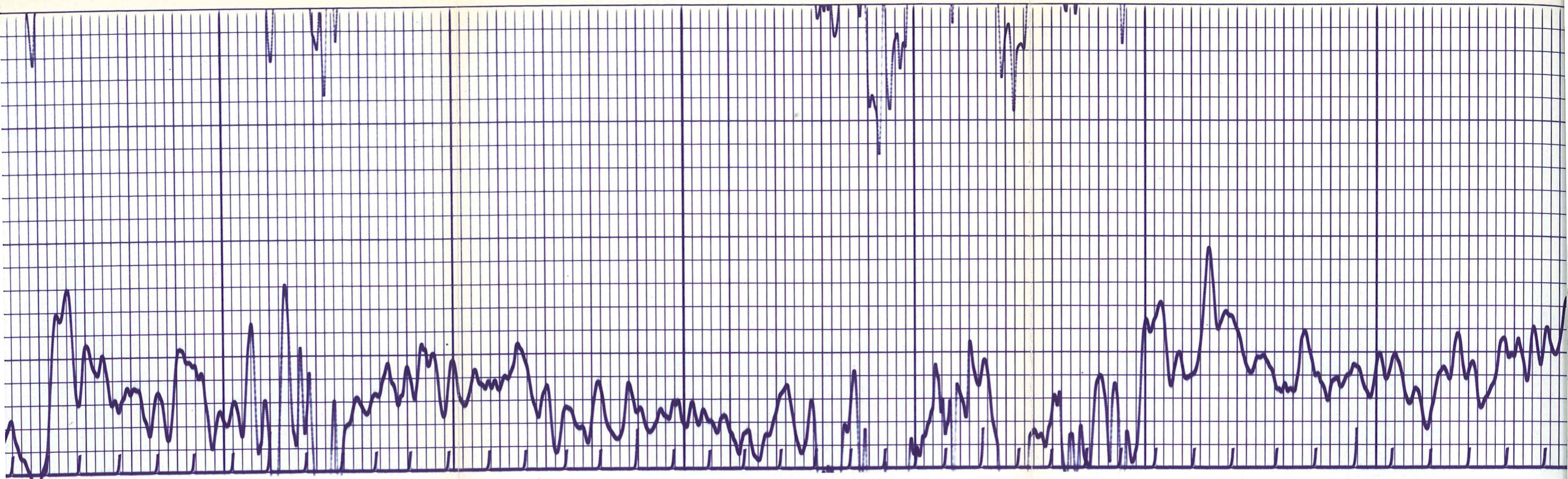
1100

1200



caliper

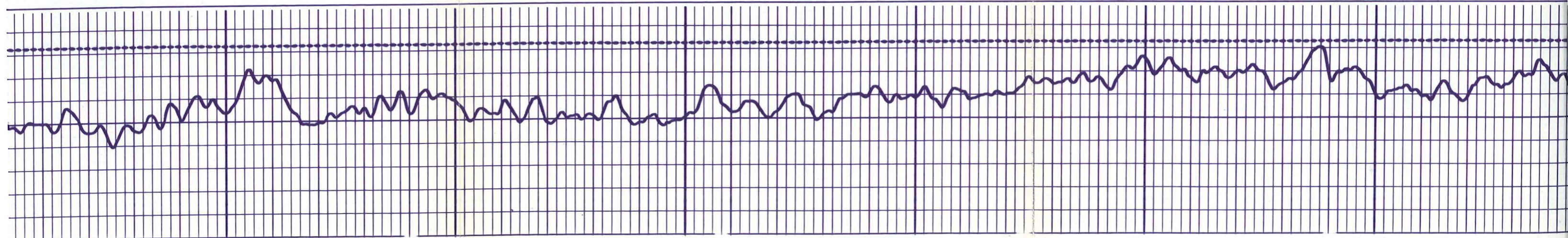
GR

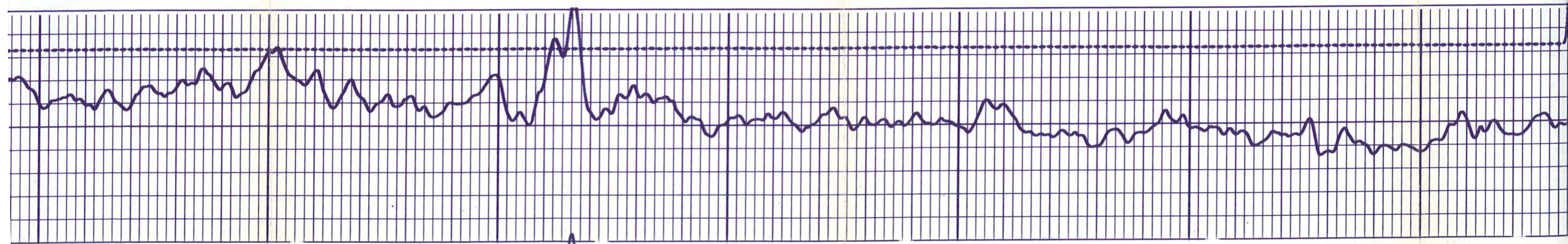
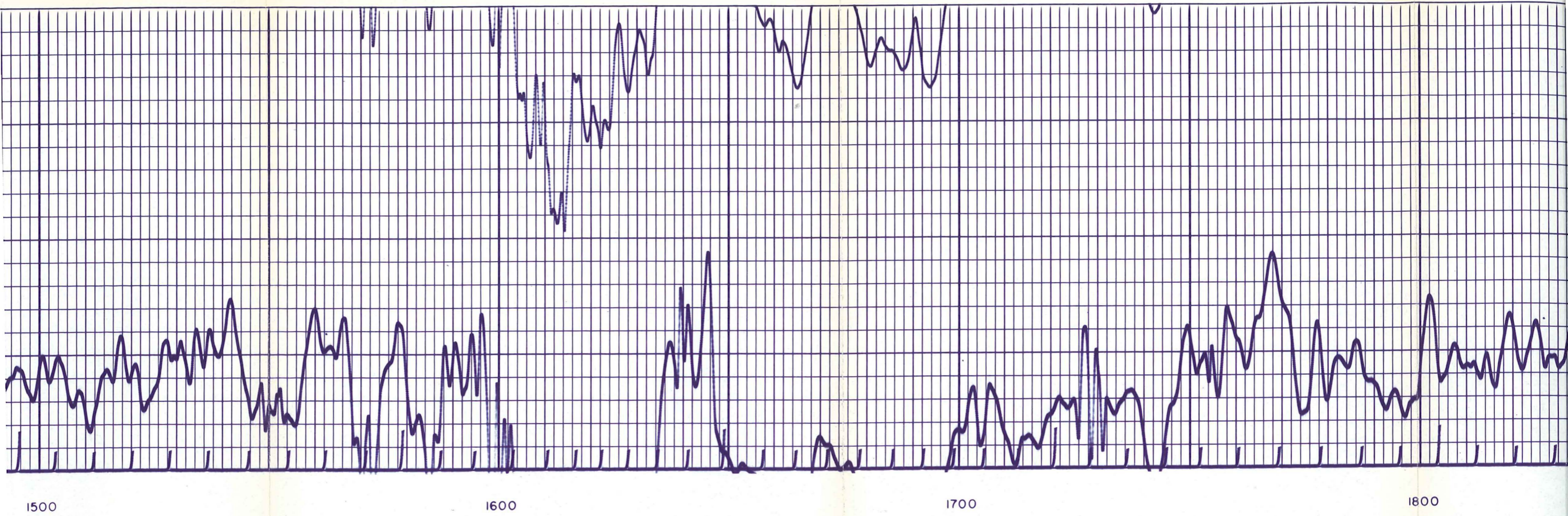


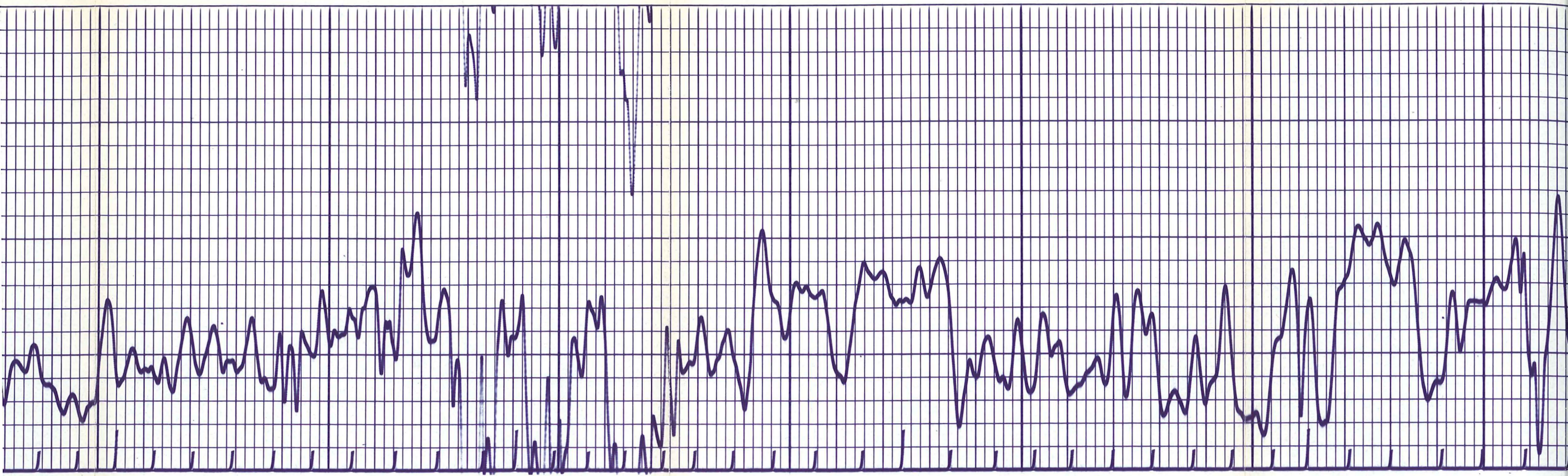
1300

1400

1500







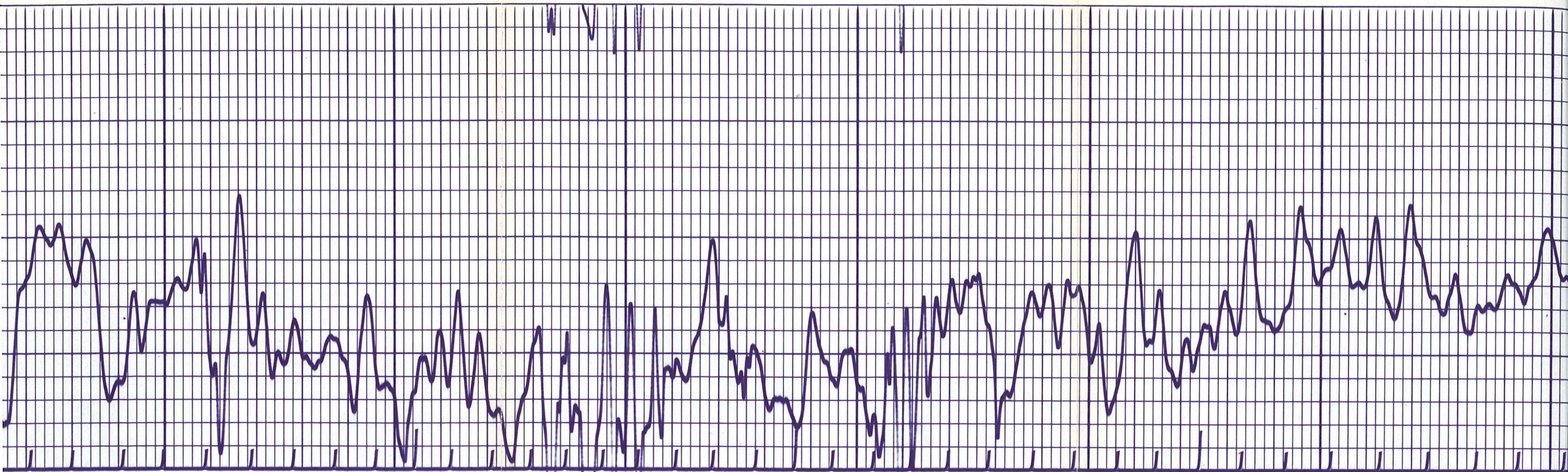
1800

1900

2000

2100



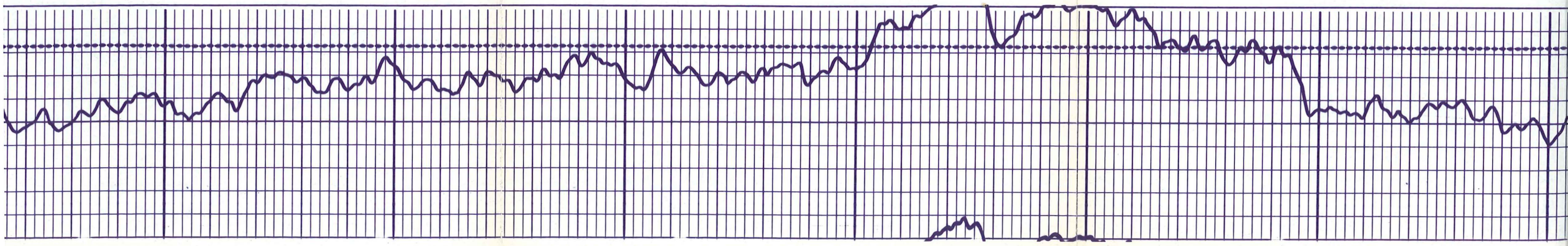


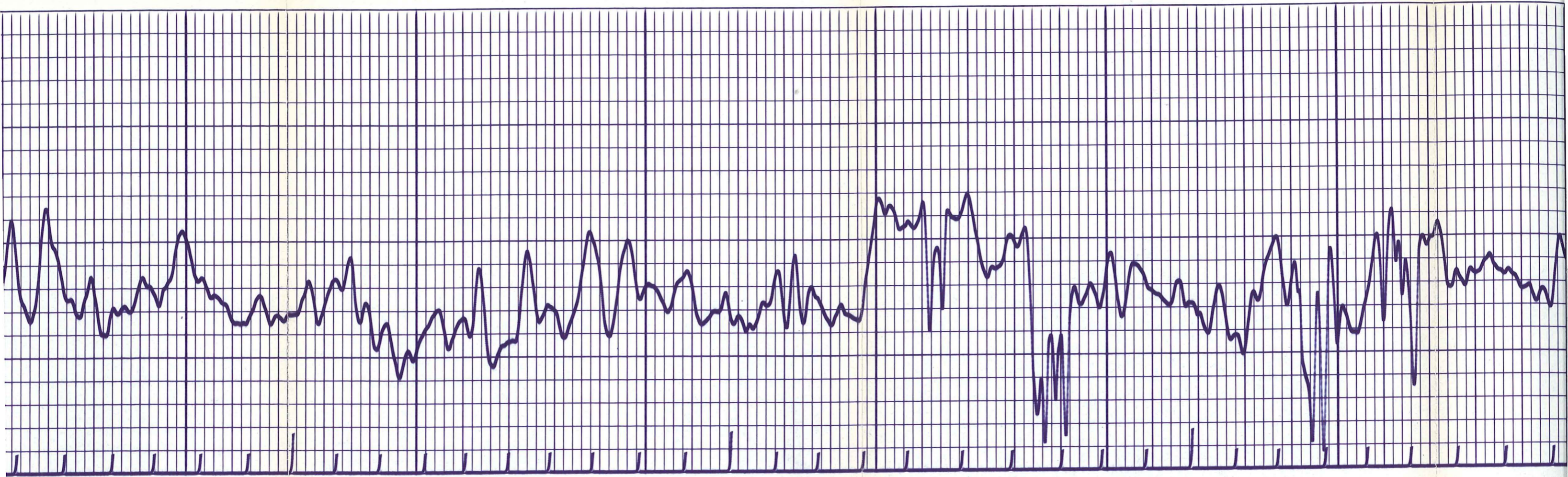
2100

2200

2300

2400



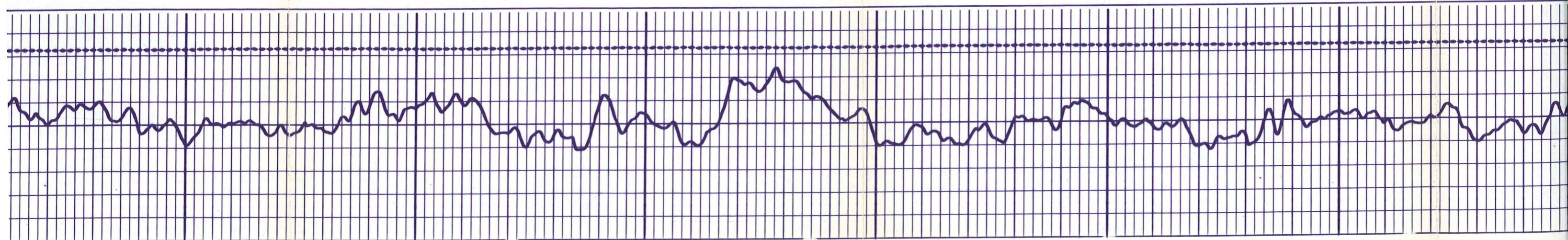


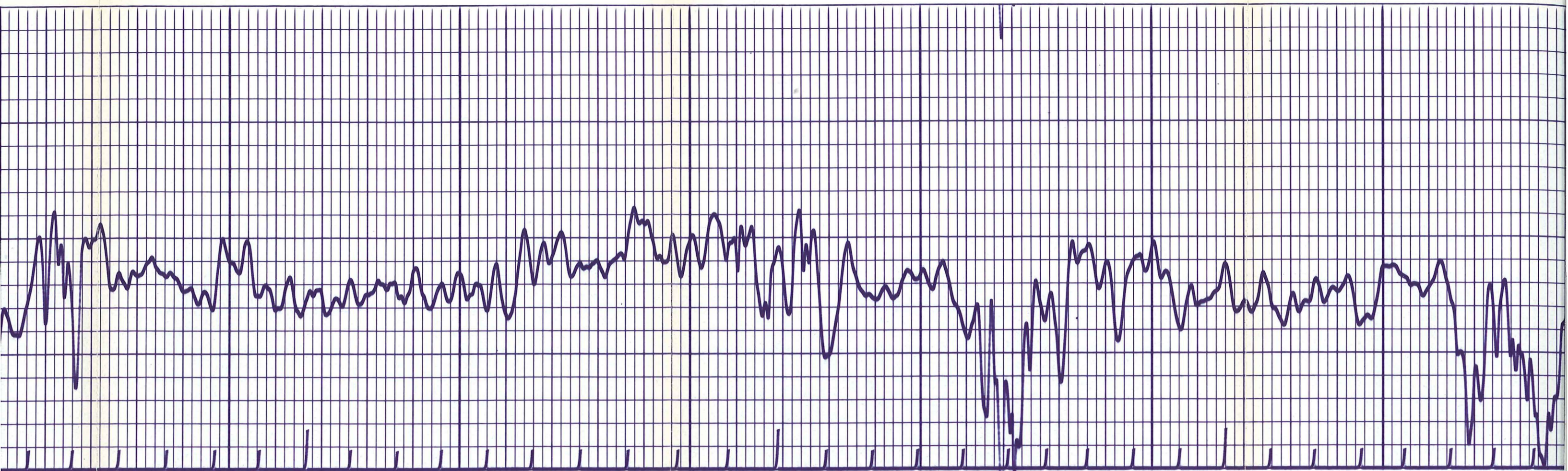
2400

2500

2600

27

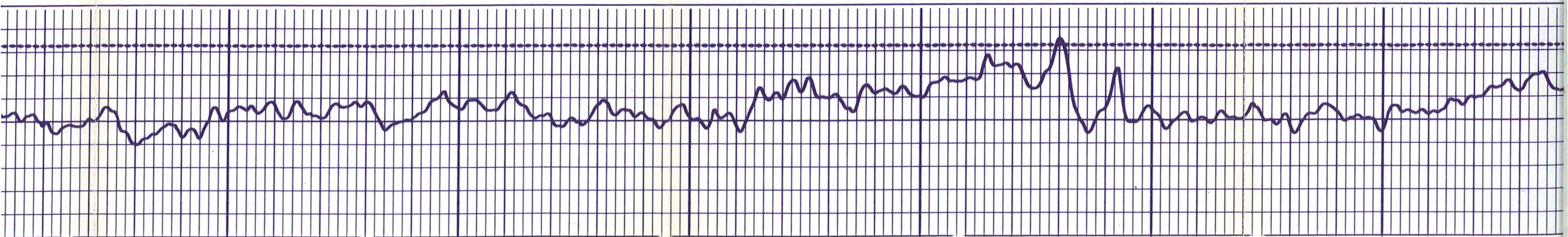


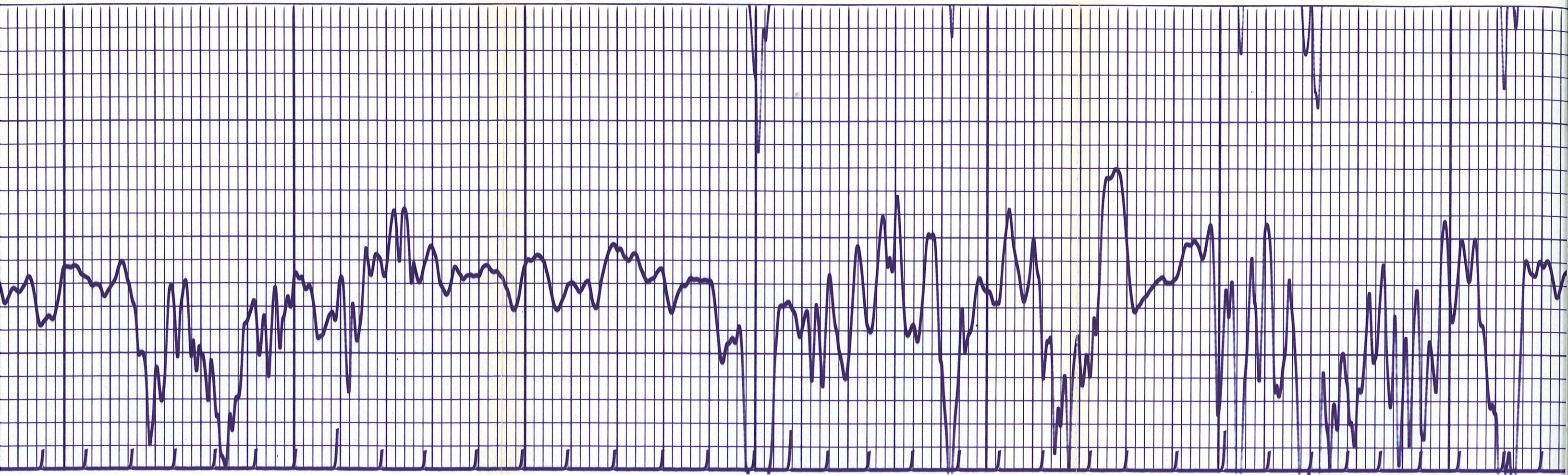


2700

2800

2900

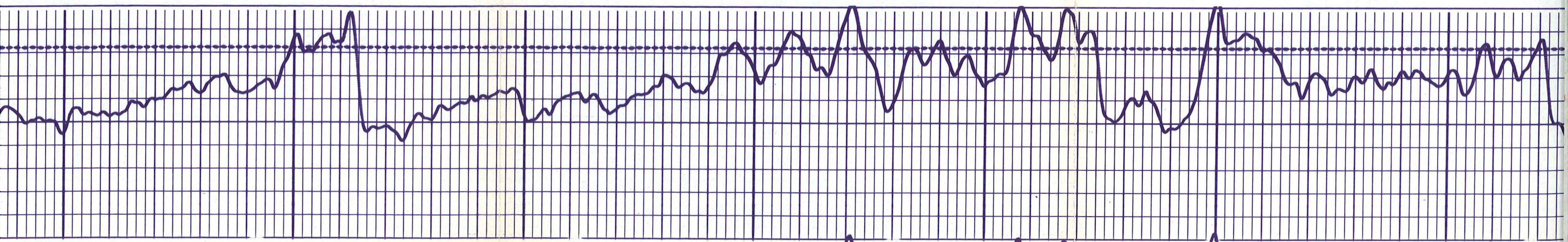


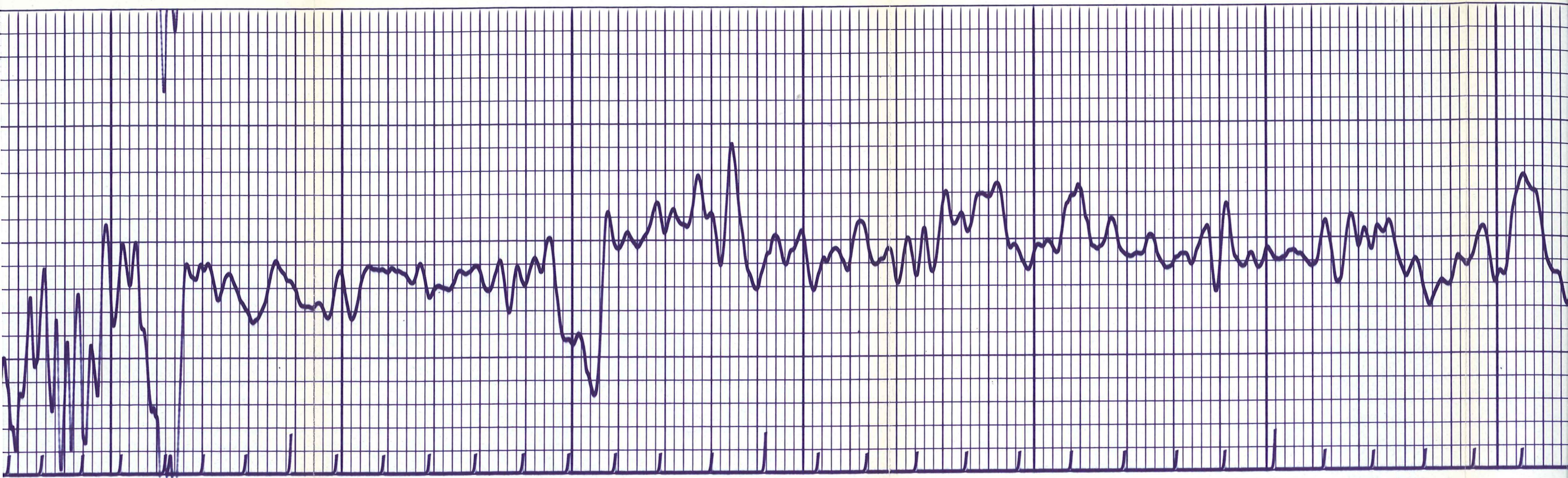


3000

3100

3200

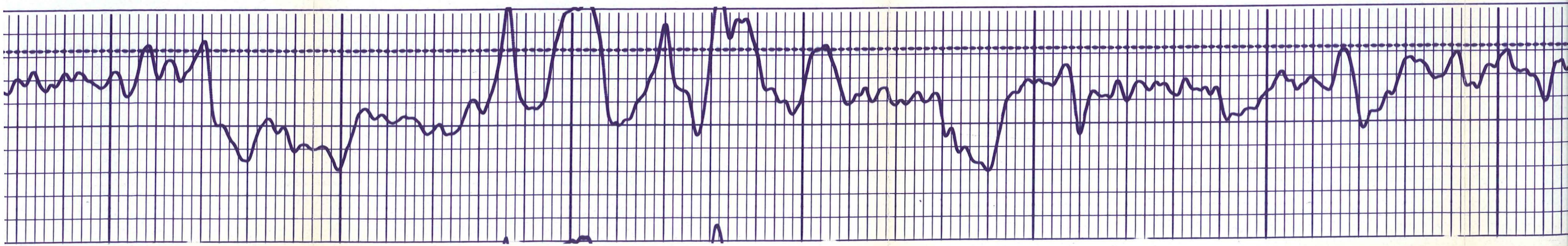


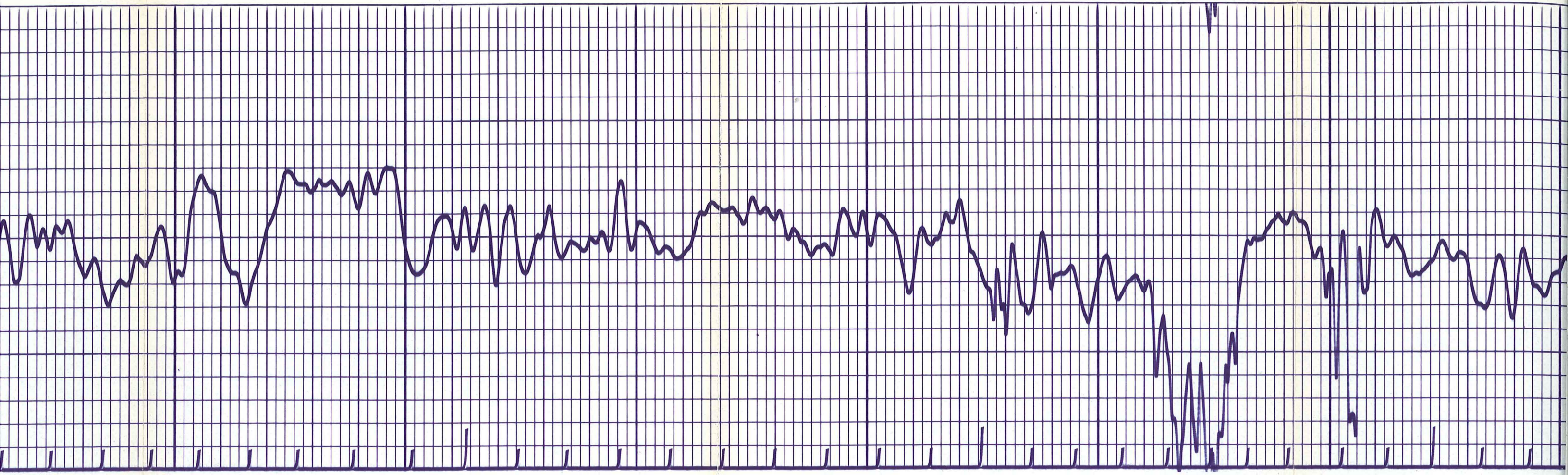


3300

3400

3500

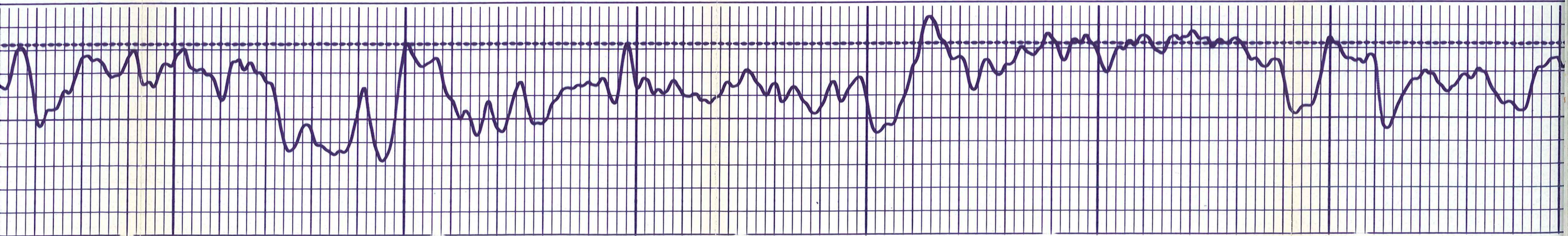


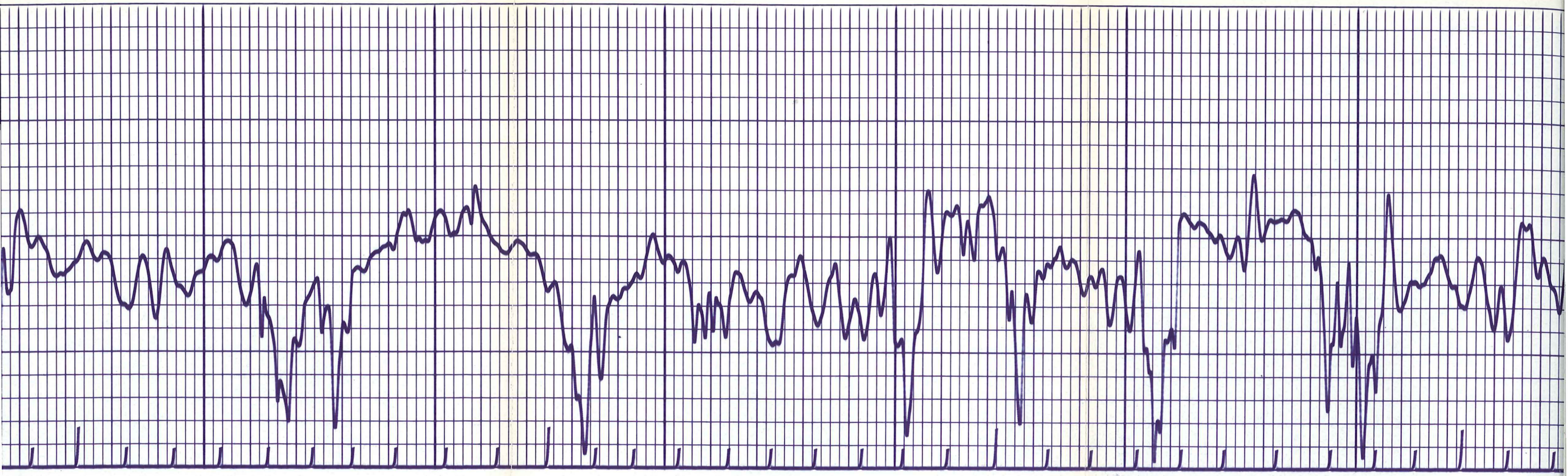


3600

3700

3800

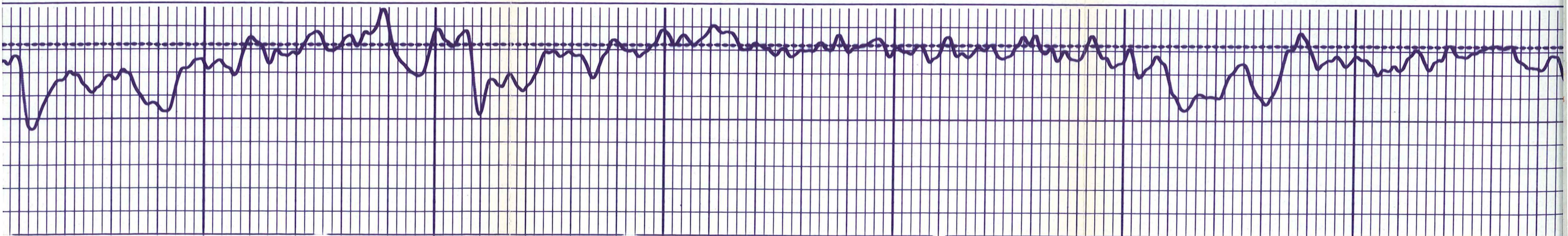


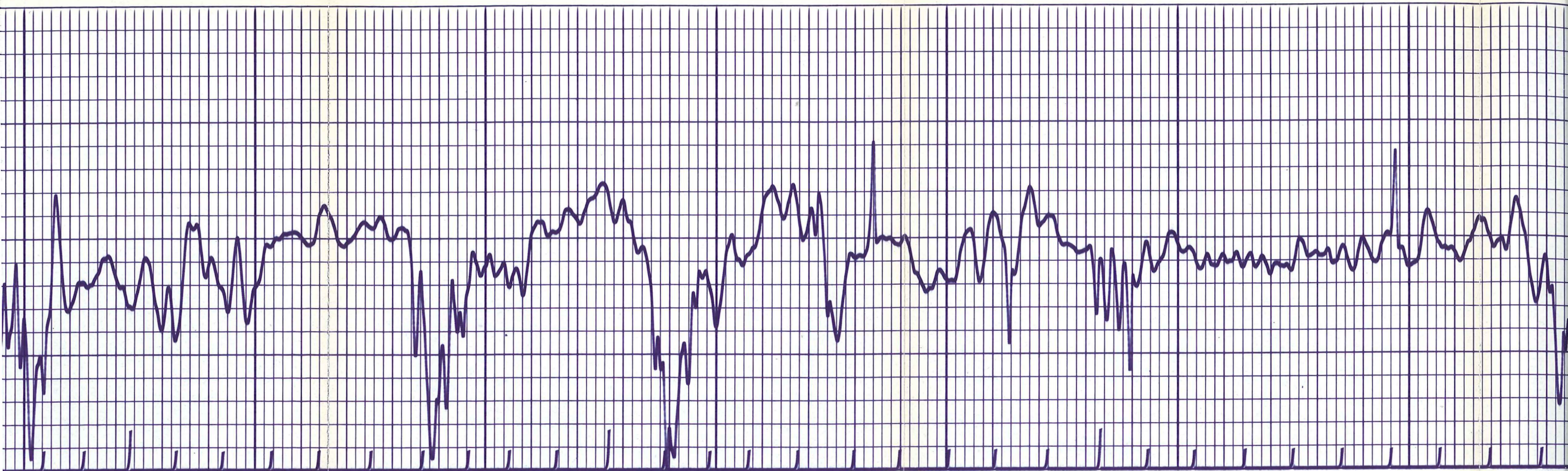


3900

4000

4100





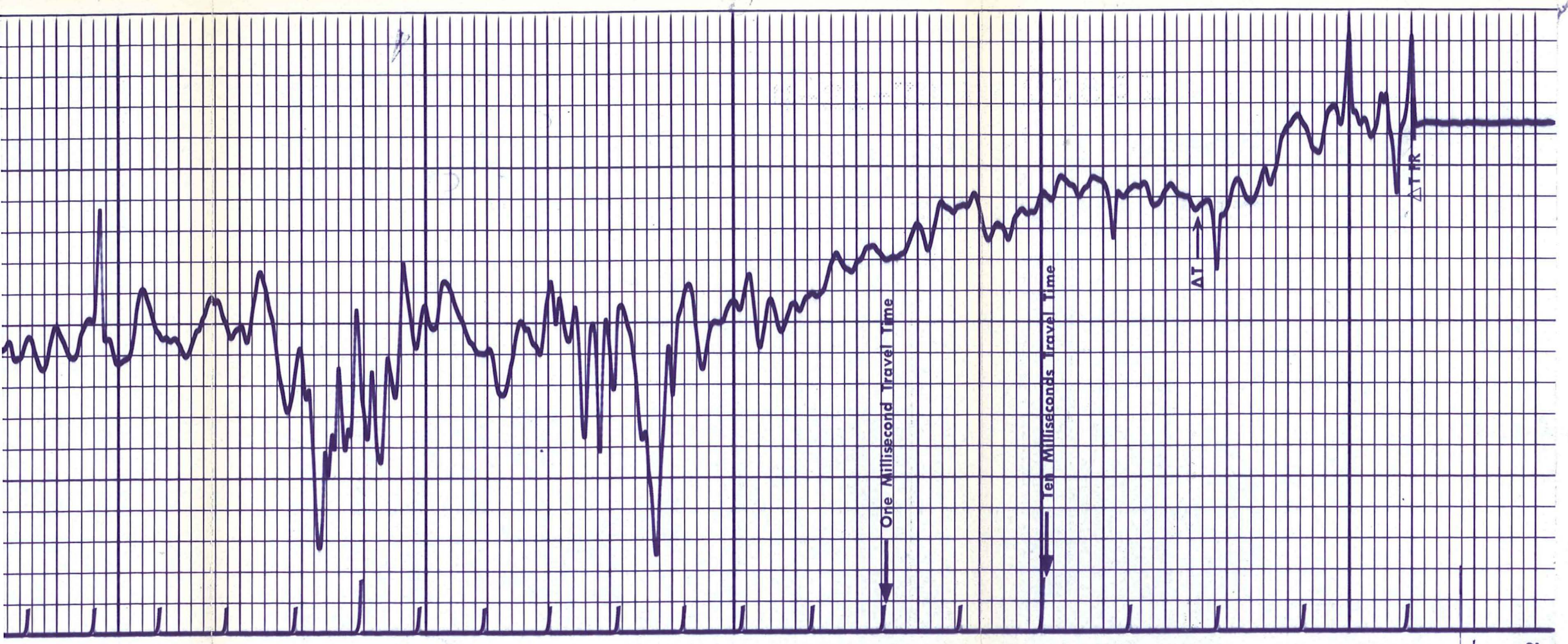
4100

4200

4300

4400



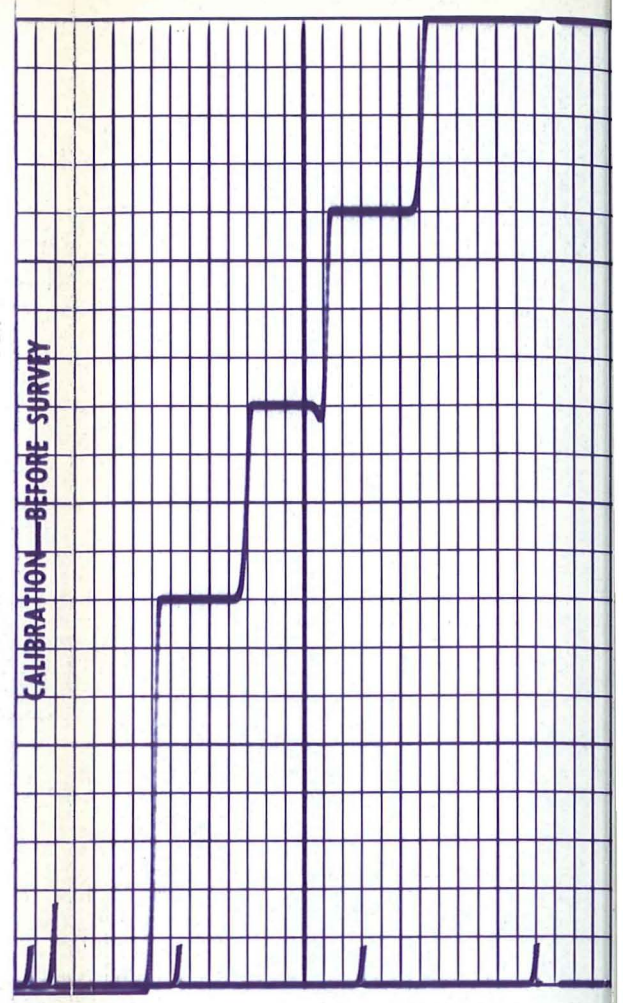
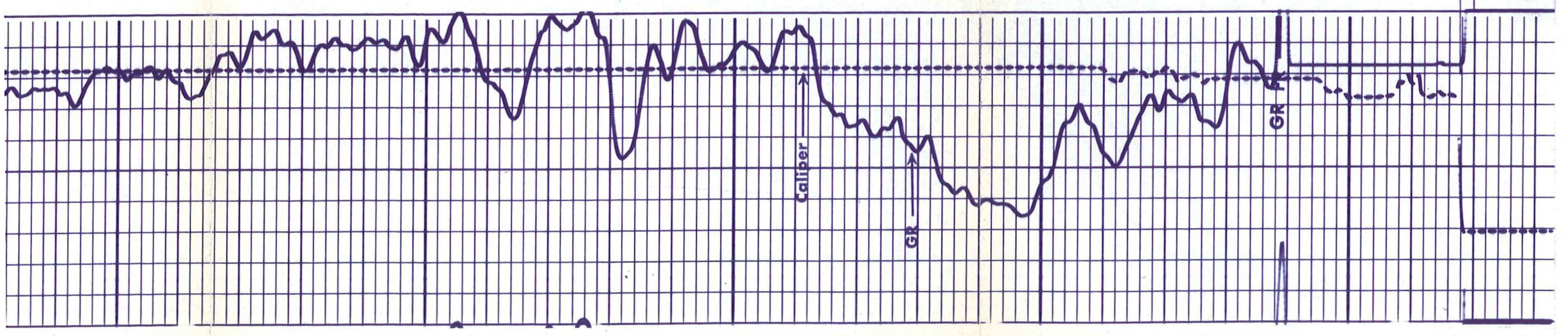


4400

4500

4600

Run 2



Run 2

6

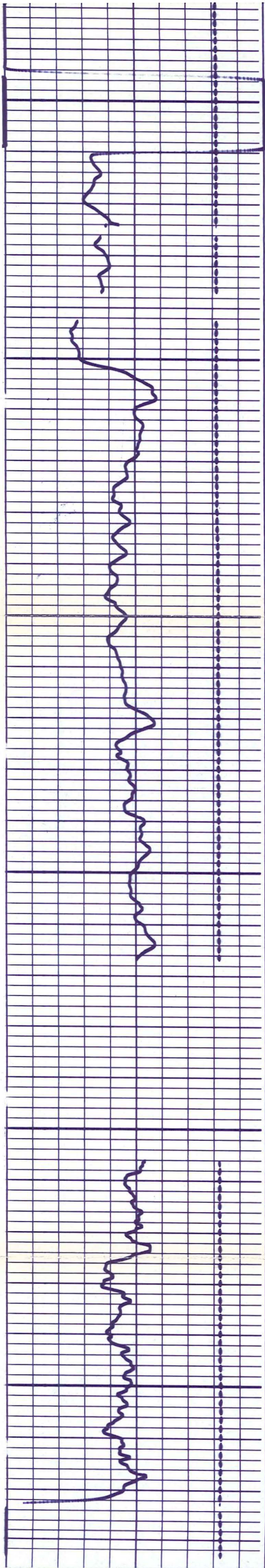
5

4

3

2

1



5
4
3
2
1

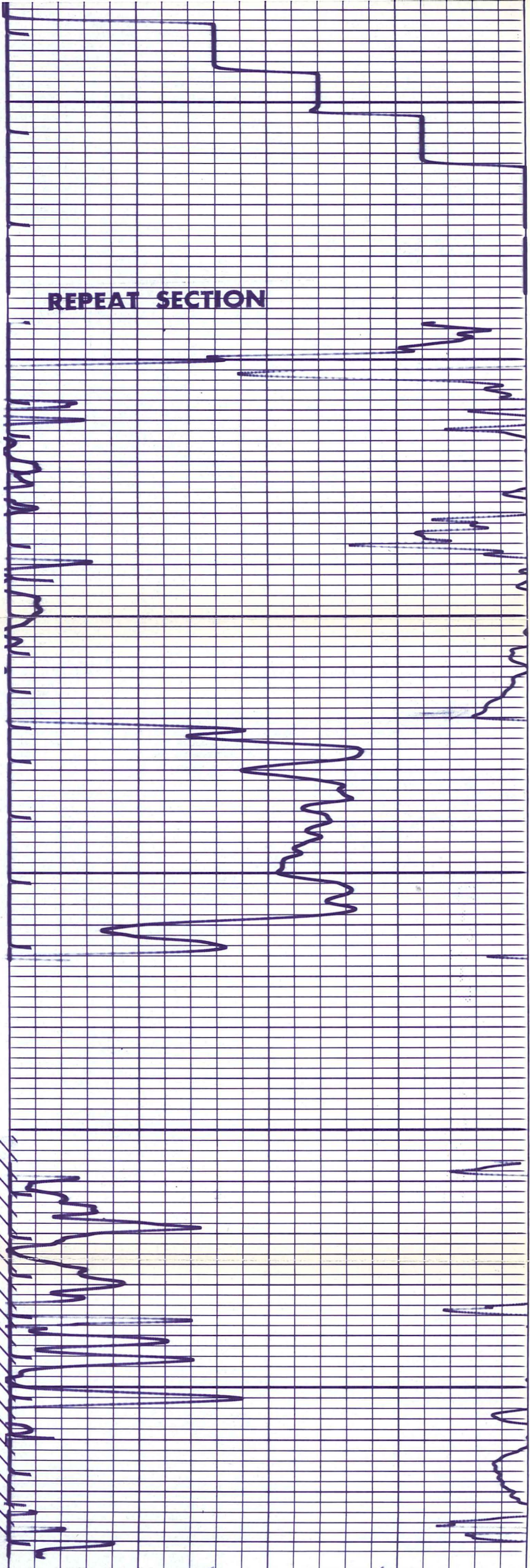
REPEAT SECTION

0900

1000

MEMORIZER OUT — CURVES INVALID

Run 2



Run 2 ↑

| | | |
|-----------|-----|-----------------|
| GAMMA RAY | | API UNITS |
| 0 | 200 | |
| 200 | 400 | |
| CALIPER | | DIAM. IN INCHES |
| 6 | 16 | |

DEPTH

| | | |
|--|-----|--|
| ↑ INTEGRATED TRAVEL TIME (RECORDED 7 1/2' DEEP) | | |
| INTERVAL TRANSIT TIME | | MICROSECONDS PER FOOT |
| 140 | 90 | T ₃ R ₁ 2R ₂ 40 |
| 240 | 190 | 140 |

Run 2

GAMMA RAY API UNITS

0 200
200 400

CALIPER DIAM. IN INCHES

6 16

INTERGRATED TRAVEL TIME
(RECORDED 7 1/2' DEEP)

| INTERVAL TRANSIT TIME | | MICROSECONDS PER FOOT | T. 3 R. 2 R. 2 |
|-----------------------|-----|-----------------------|----------------|
| 140 | 90 | | 40 |
| 240 | 190 | | 140 |

Run 2

DEPTH

DETAIL LOG

RUN 3 5" = 100'

CALIPER DIAM. IN INCHES

6 16

NOTE REMARKS

GAMMA RAY API UNITS
RUN THREE - NOT RUN

| INTERVAL TRANSIT TIME | | MICROSECONDS PER FOOT | T. 3 R. 2 R. 2 |
|-----------------------|-----|-----------------------|----------------|
| 140 | 90 | | 40 |
| 240 | 190 | | 140 |

INTERGRATED TRAVEL TIME
(RECORDED 9' DEEP)

Run 3

DEPTH

Caliper

One Millisecond Travel Time

Ten Milliseconds Travel Time

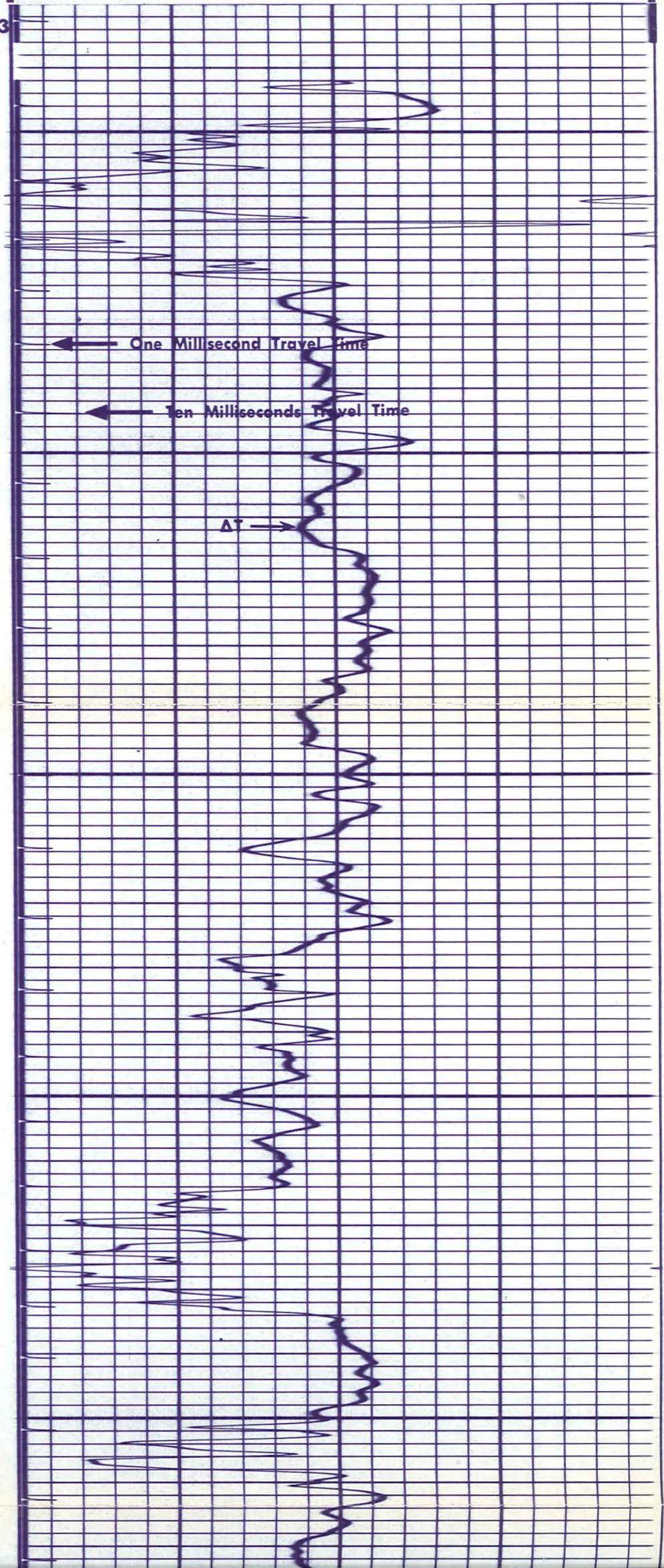
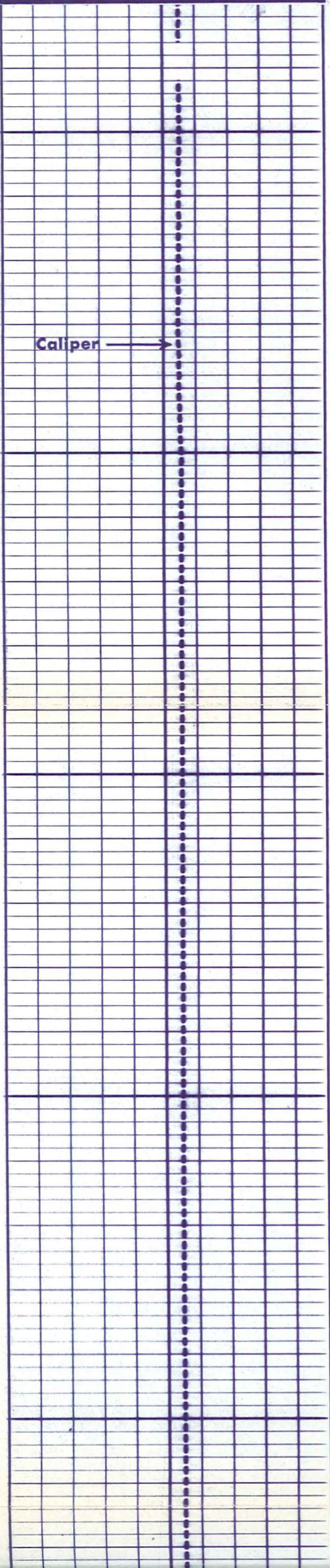
ΔT

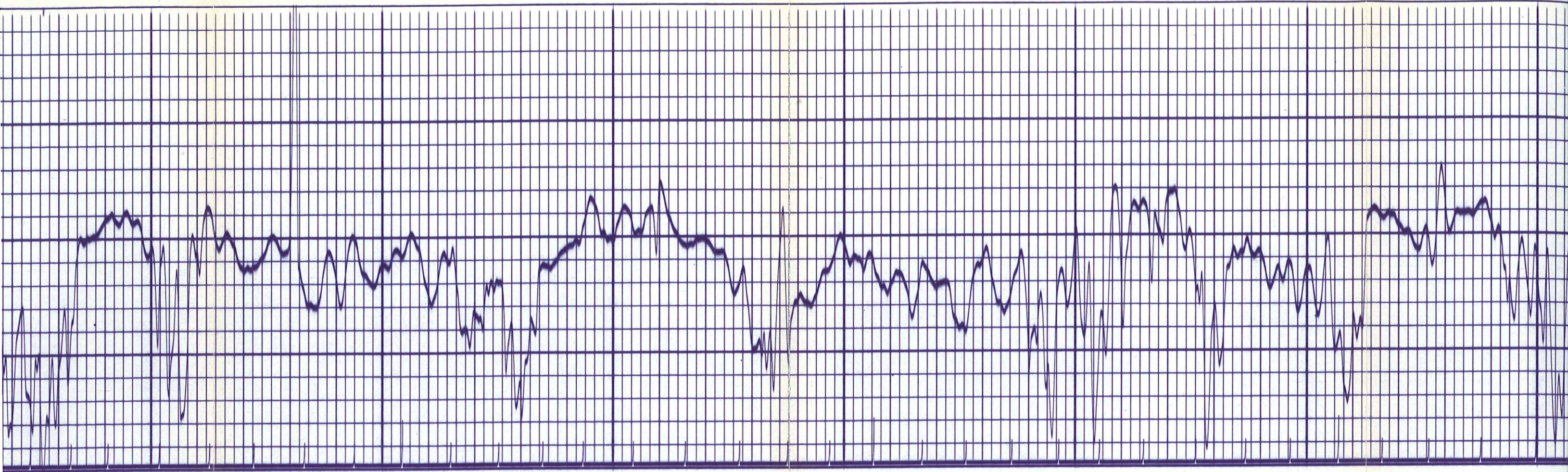
Run 3

3600

3700

3800



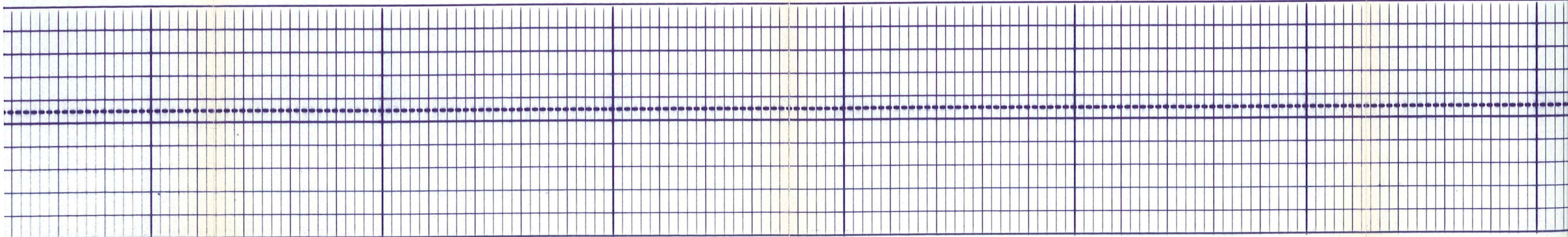


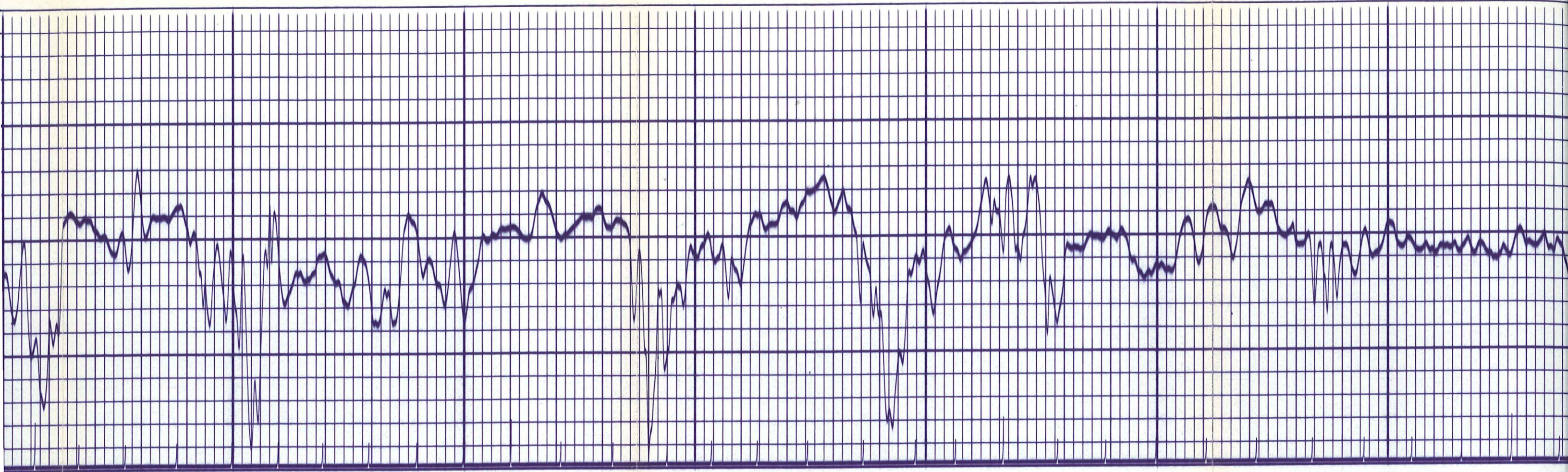
3800

3900

4000

4100

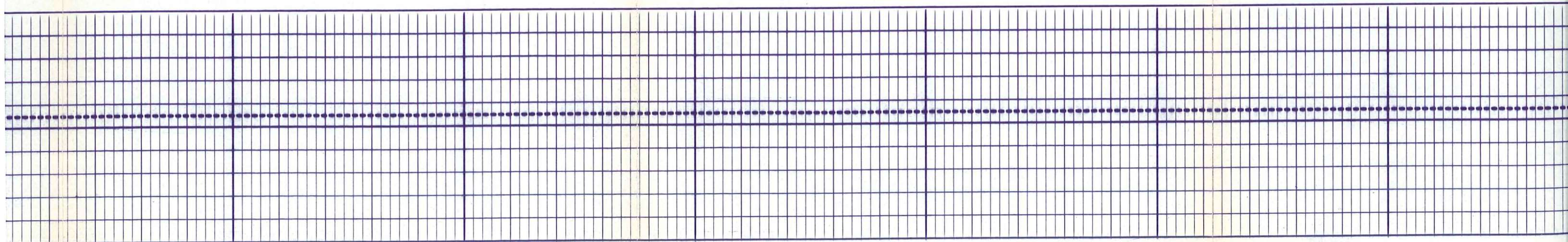


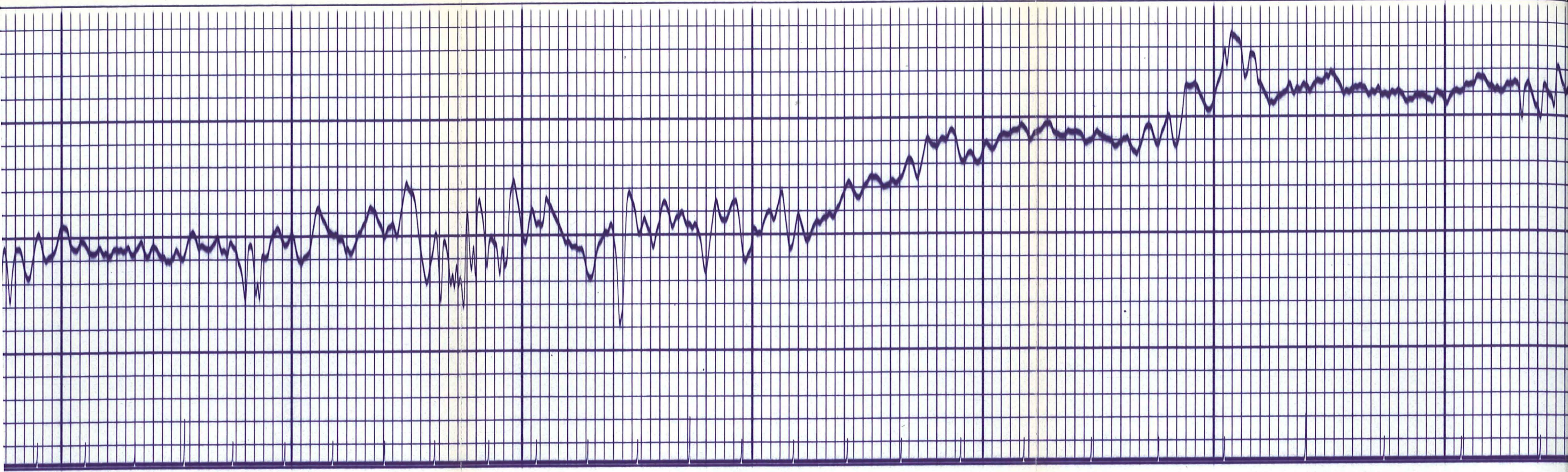


4100

4200

4300

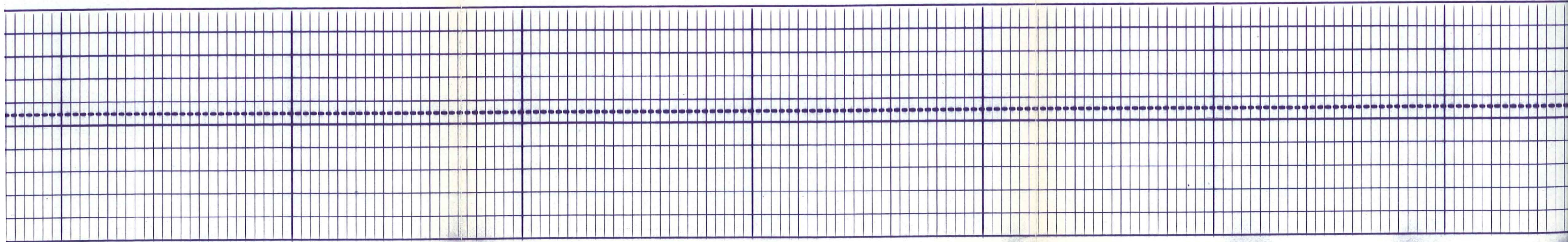


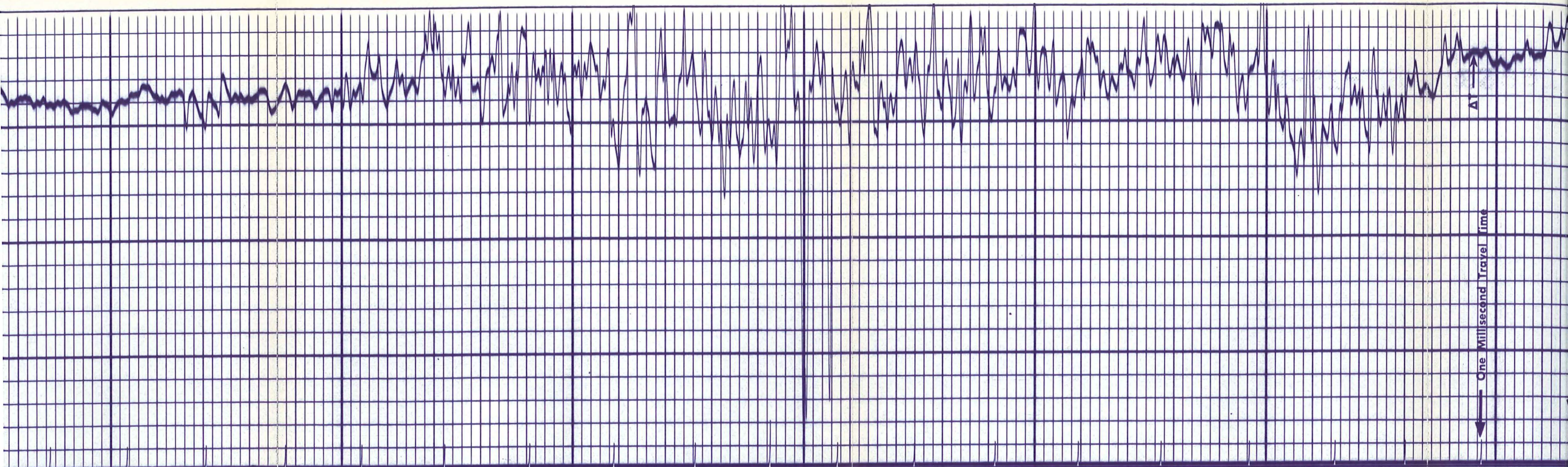


4400

4500

4600



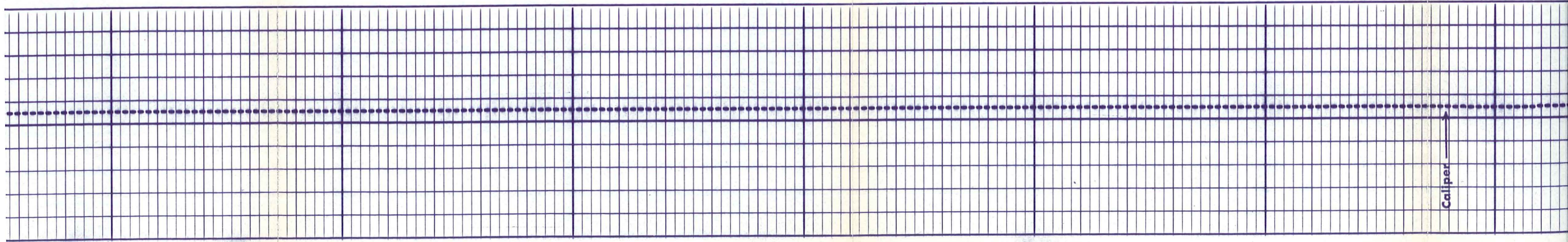


4700

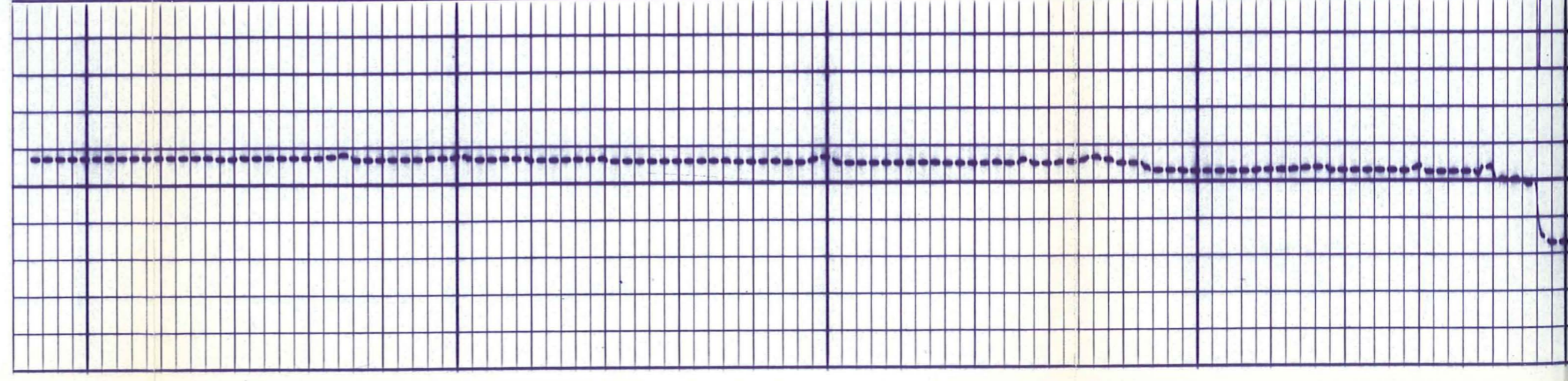
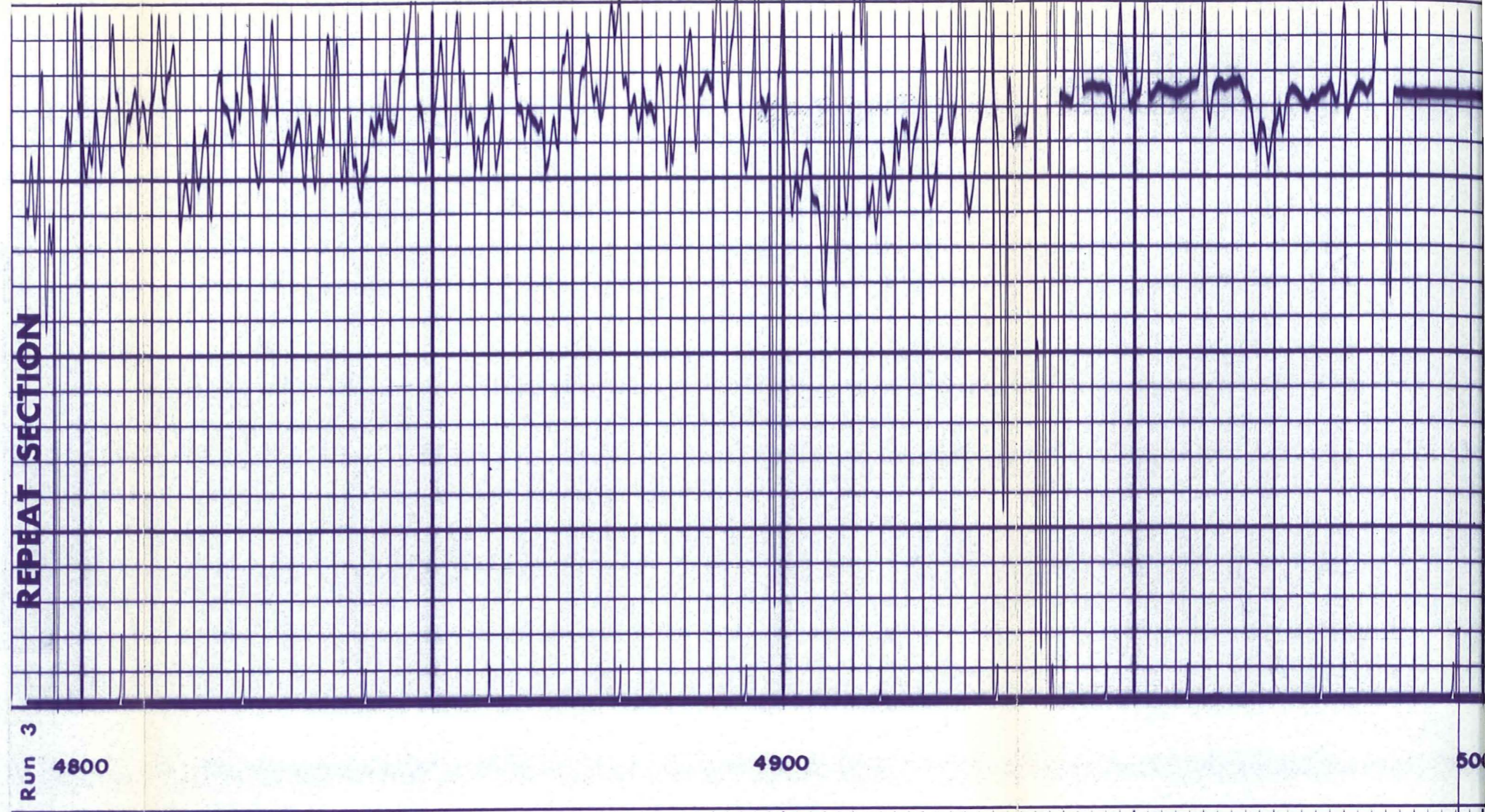
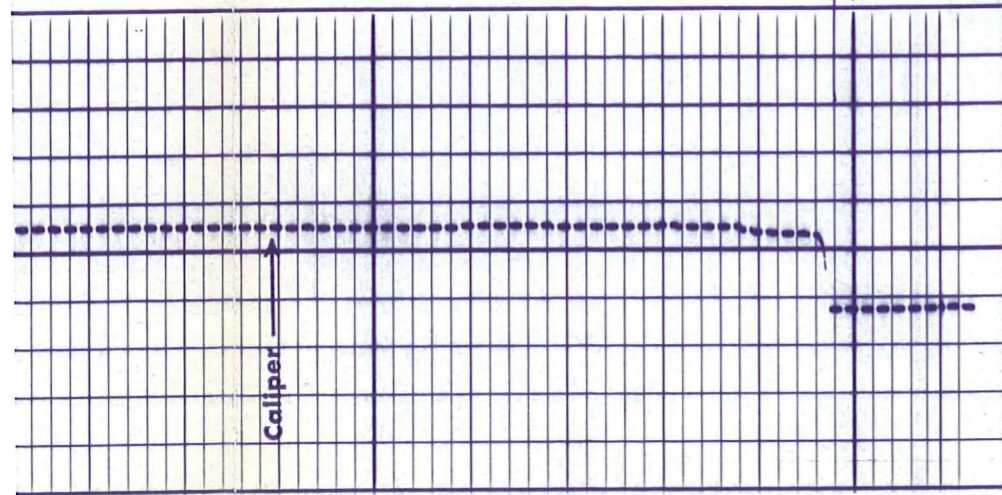
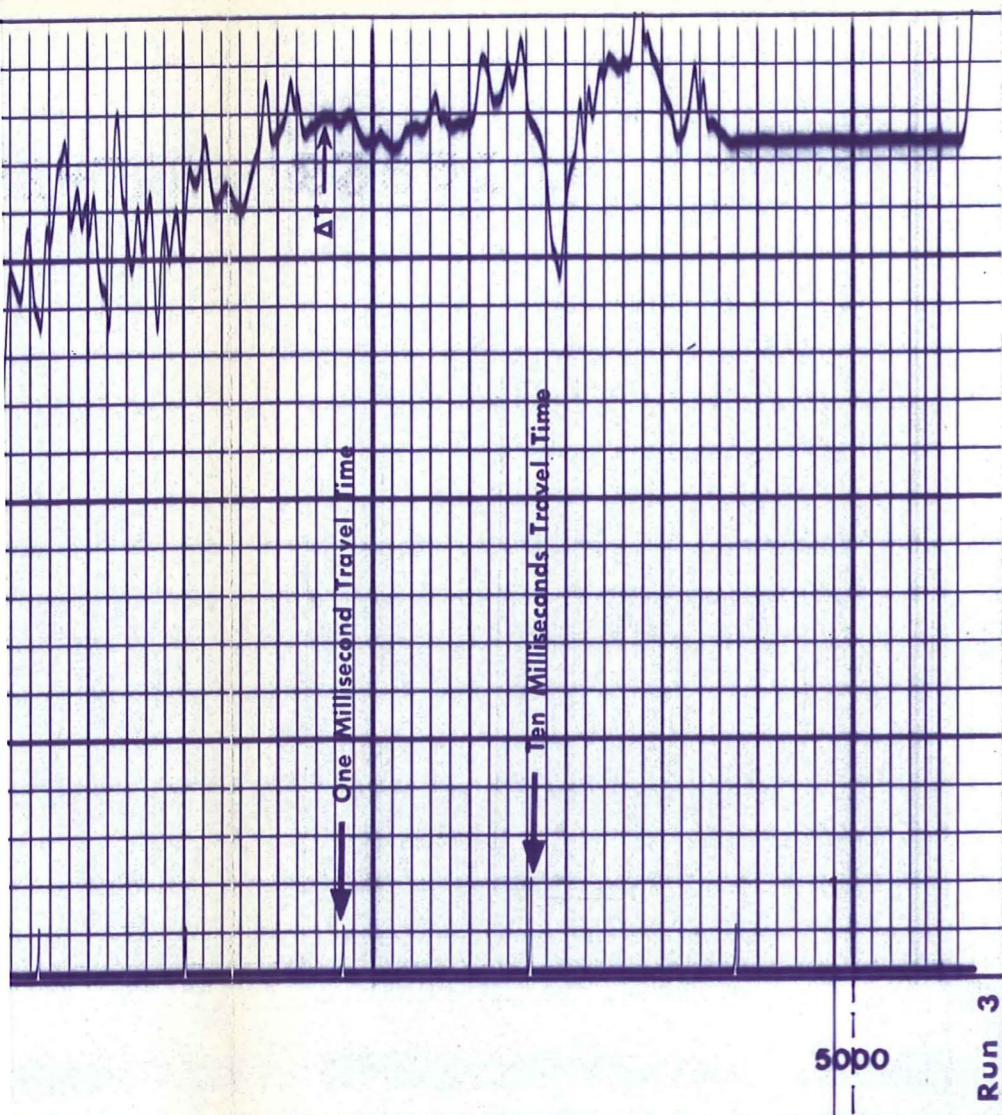
4800

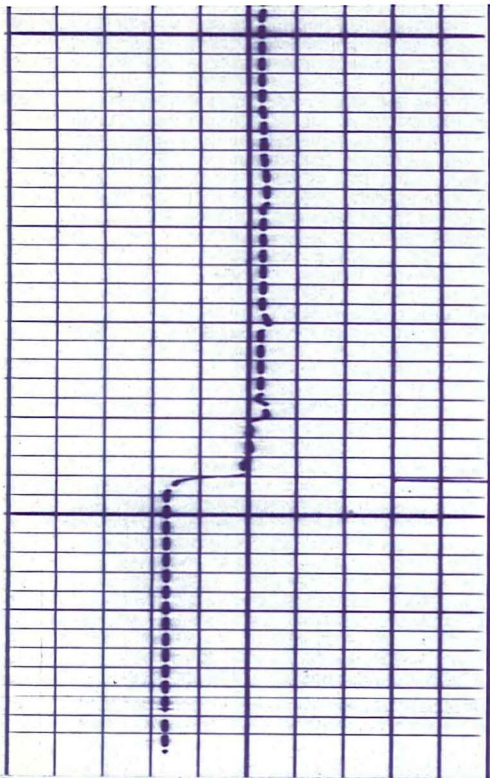
4900

One Millisecond Travel Time

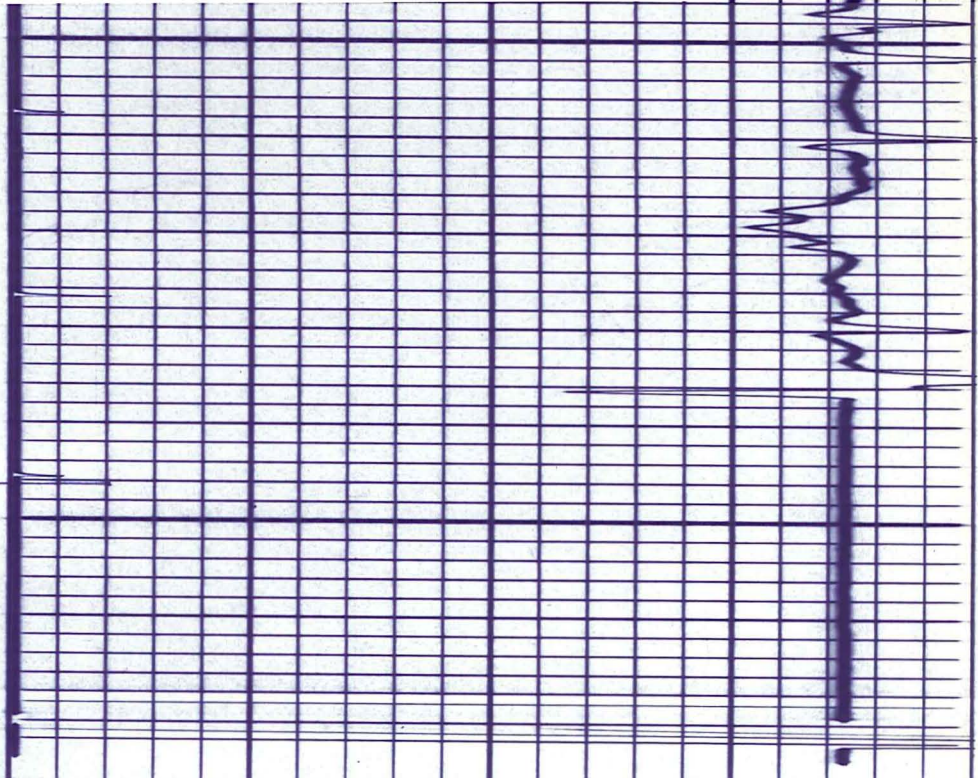


Caliper





5000
Run 3



GAMMA RAY API UNITS
RUN THREE - NOT RUN

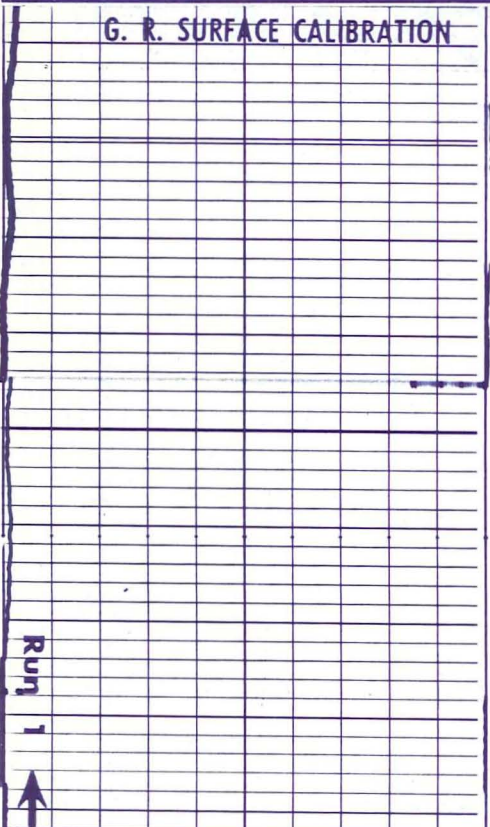
↑ INTERGRATED TRAVEL TIME
(RECORDED 9' DEEP)

CALIPER DIAM. IN INCHES
6 NOTE REMARKS 16

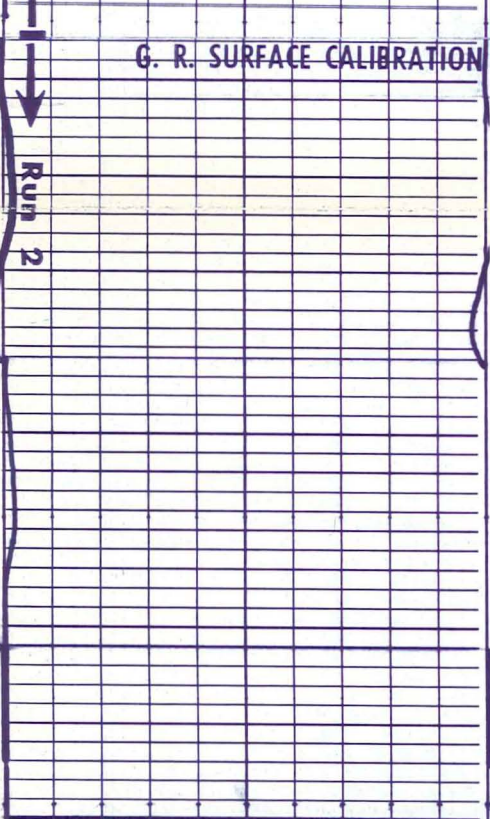
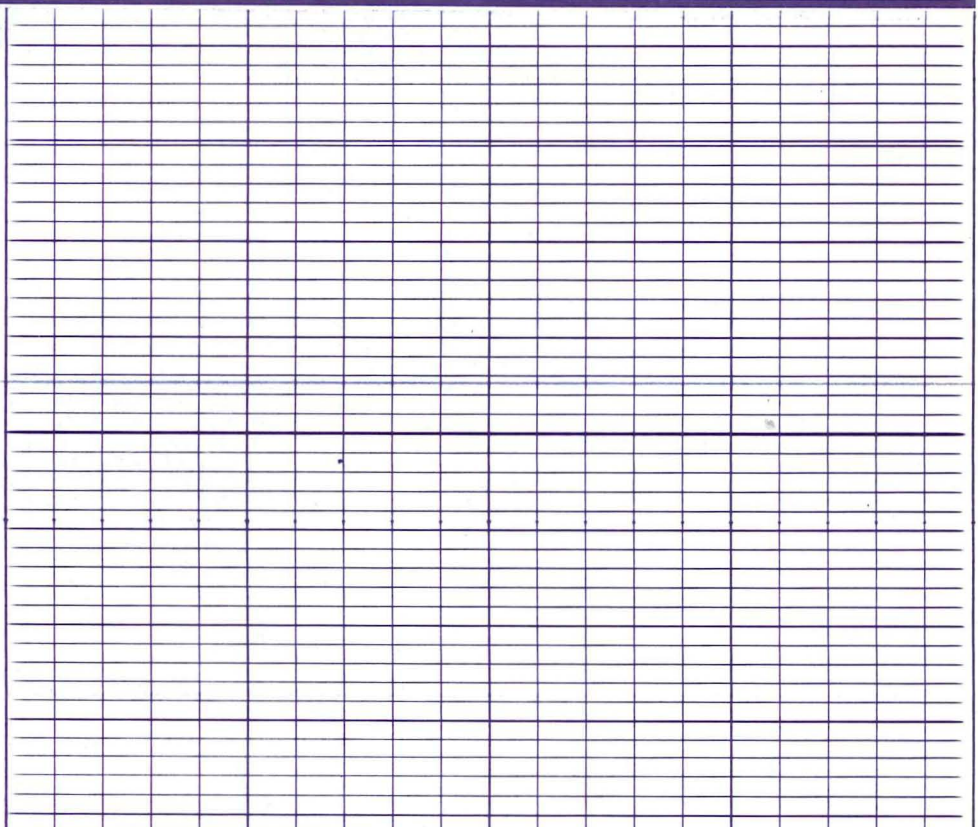
DEPTH

| INTERVAL TRANSIT TIME | MICROSECONDS PER FOOT | T ₃ | R ₁ | 2R ₂ |
|-----------------------|-----------------------|----------------|----------------|-----------------|
| 140 | 90 | | | 40 |
| 240 | 190 | | | 140 |

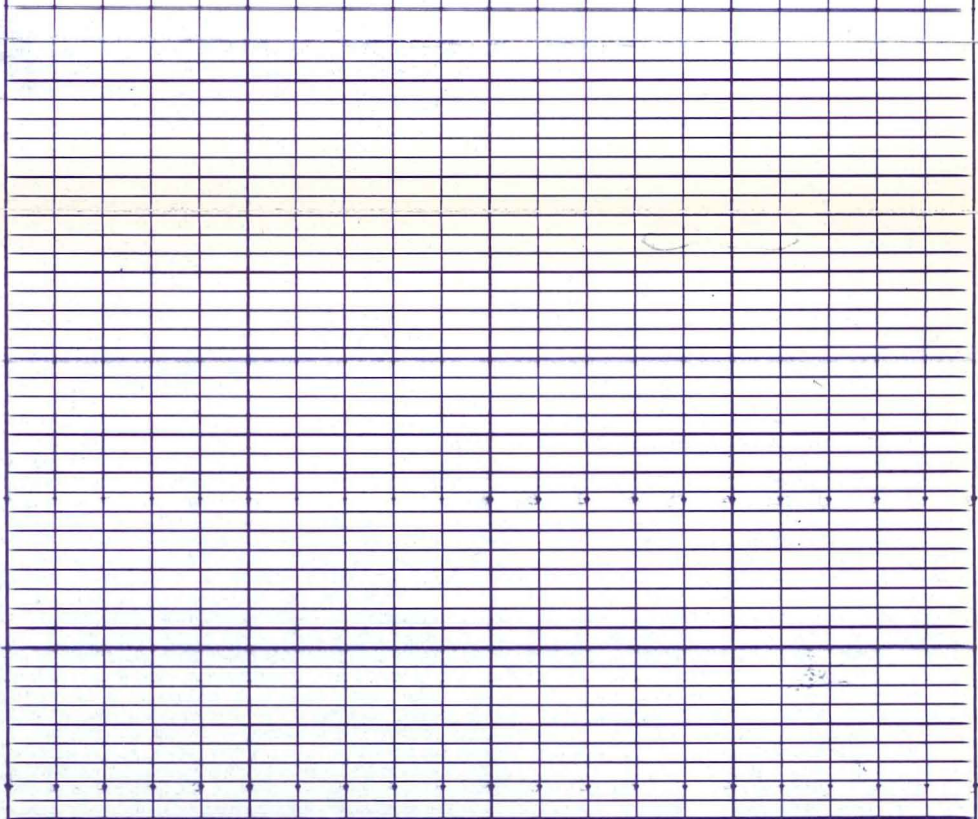
CALIBRATION RECORD



Run 1
6
5
3
1



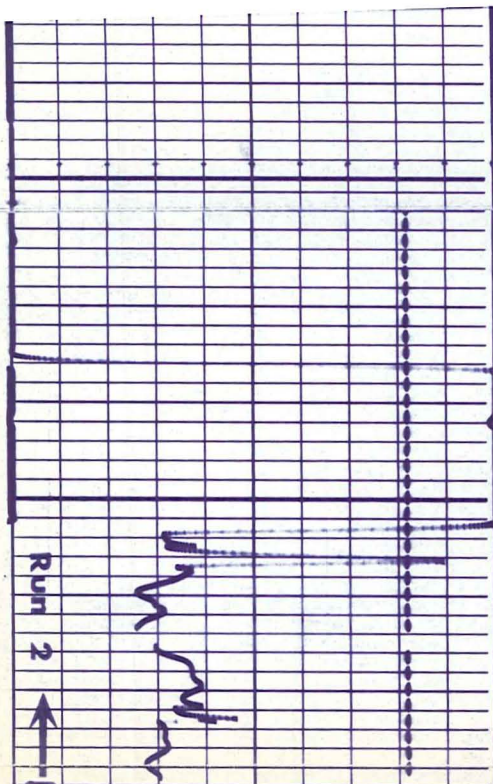
Run 1
Run 2
6
5
3
1



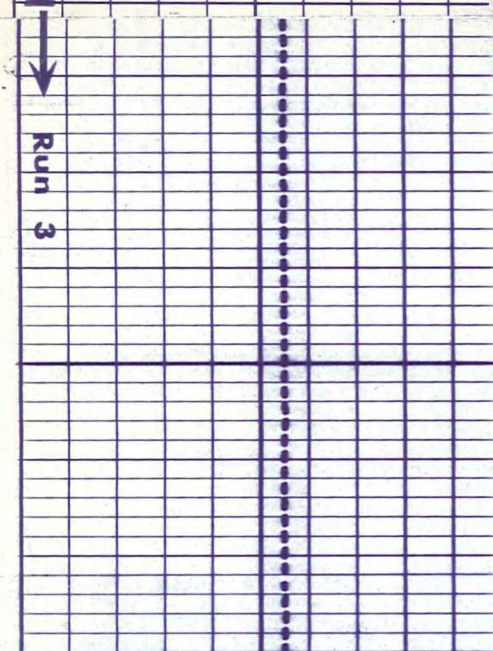
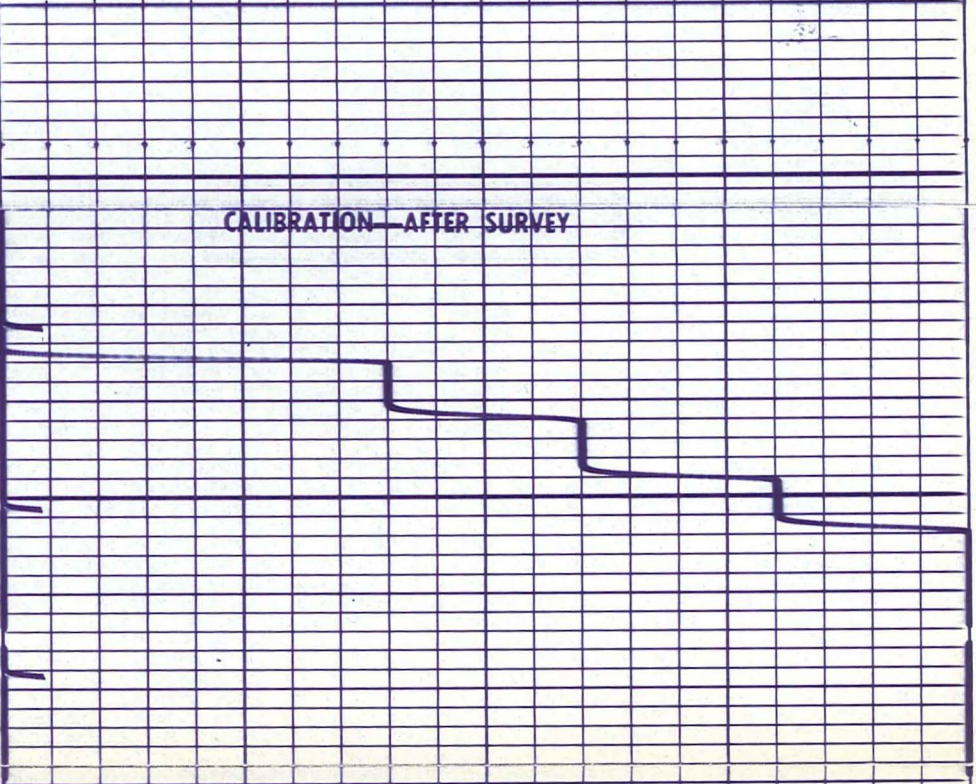
6
5
4
3



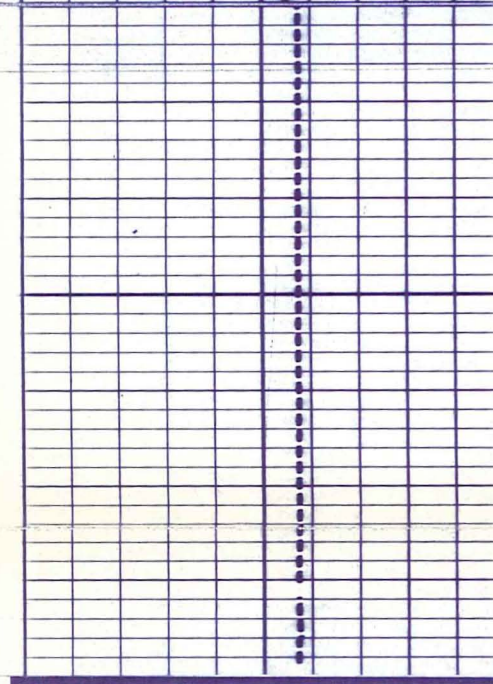
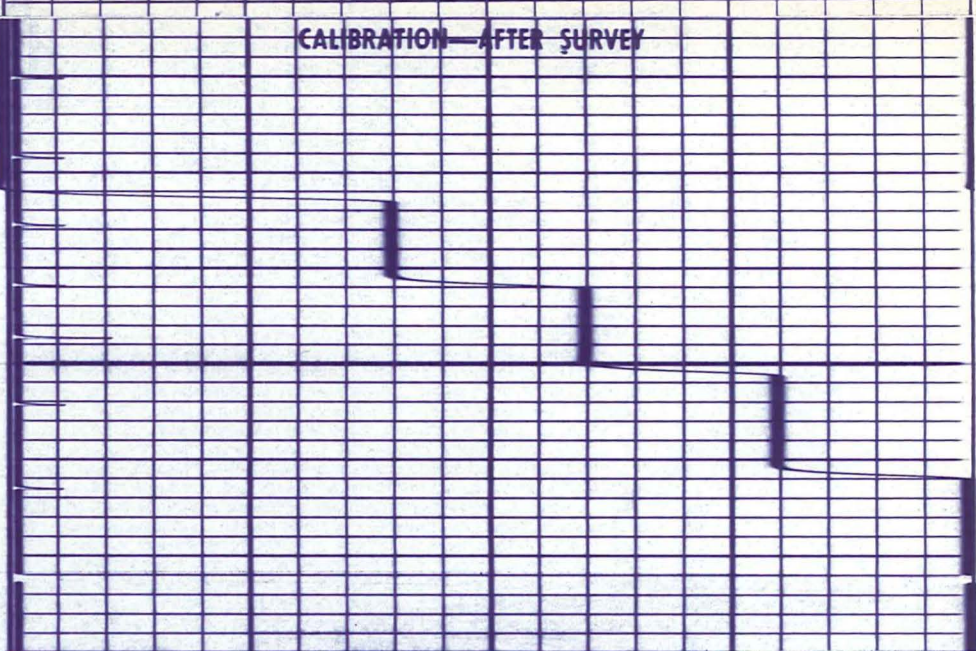
CALIBRATION AFTER SURVEY



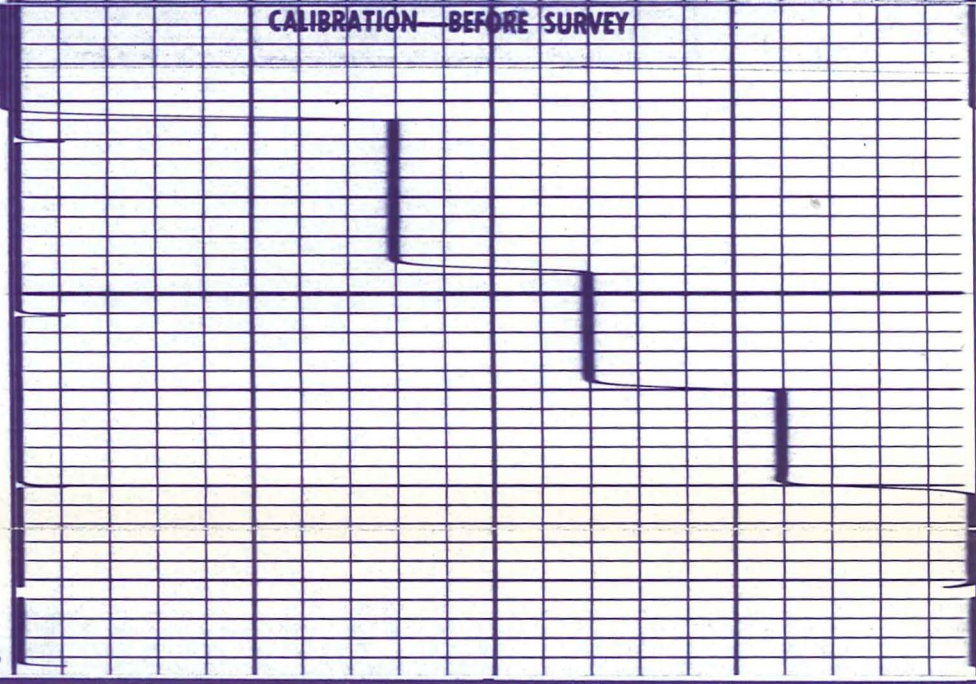
3
1
6
5
4
3
2
1
Run 2



Run 3
6
5
4
3
2
1
Run 3



6
5
4
3
2
1
Run 3



BOREHOLE COMPENSATED SONIC CALIBRATION CODING

- 1. MECHANICAL ZERO
- 2. 40 μ SEC/FT
- 3. 60 μ SEC/FT
- 4. 80 μ SEC/FT
- 5. 100 μ SEC/FT
- 6. 140 μ SEC/FT

GAMMA RAY CALIBRATION CODING

- 1. MECHANICAL ZERO
- 2. ELECTRICAL ZERO
- 3. RECORDER SENSITIVITY
- 4. MEMORIZER ADJUSTMENT
- 5. BACKGROUND
- 6. CALIBRATION

↑
CALIBRATION RECORD

COMPANY AEROJET NUCLEAR - INEL
 WELL RRGE #1
 FIELD RAFT RIVER GEOTHERMAL
 COUNTY CASSIA STATE IDAHO

SCHL. FR 4998
 SCHL. TD 5000
 DRLR TD 5007
 Elev: KB ----
 DF ----
 GL 4835