

Riometer Records of 30 MHz Cosmic Noise at
Syowa Station, Antarctica in 1971

Takanobu OGATA and Masami OSE
(Radio Research Laboratories, Koganei-shi, Tokyo)

1. Introduction

The observation of 30 MHz cosmic radio noise with a standard riometer (relative ionospheric opacity meter) has been carried out at Syowa Station, Antarctica since February 1966 by representatives from the Radio Research Laboratories.

This report has been prepared in order to make the data available to ionospheric physicists. The records covering the period from January 1 to December 31, 1971 are deposited at the Radio Research Laboratories.

Inquiries about the contents of this report should be addressed to :

Radio Research Laboratories
Ministry of Posts and Telecommunications
2-1, Nukui-Kitamachi 4-chome, Koganei-shi,
Tokyo 184, Japan

2. Location

Syowa Station			
Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
69°00' S	39°35' E	69.6° S	77.1° E

3. Observers

January 1971

Isao SHIRO (Radio Research Laboratories)

Toshirou SAKAMOTO (Radio Research Laboratories)

February to December 1971

Takanobu OGATA (Radio Research Laboratories)

Masami OSE (Radio Research Laboratories)

4. Method of measurement

The standard riometer at 30 MHz with 3.5 kHz bandwidth is connected to a vertically directed five-element Yagi antenna, which is designed to match the 50 ohm coaxial transmission line.

The noise power output is recorded with a pen recorder at 1 mm/min paper speed, and the standard noise with power of 0,1,2,3 and 4 dB levels is introduced into the receiver once a day as the calibration.

The time indicated on this record is the meridian time at longitude 45°E (U.T.+3 hours).

5. Remarks

The power observed in riometer is not identical with the cosmic noise power itself, but ionospheric absorption effects should be taken into account.

If the ionosphere is in a quiet state, the diurnal variation of the cosmic noise power is easily reduced. However, several complicated variations take place because of seasonal and diurnal variations and short-time abnormal absorptions in the ionosphere.

On account of movement of the earth, the time (local time) when the same radio source passed the zenith gets earlier by about 4 minutes day after day and is restored to the original state in a year because of the difference between solar and sidereal times.

Fig. 1 shows the monthly range of time of the maximum value (in solid lines) of diurnal variation of cosmic noise power on quiet days, and the time of the minimum value (in broken lines).

The range is mainly due to the time difference mentioned above.

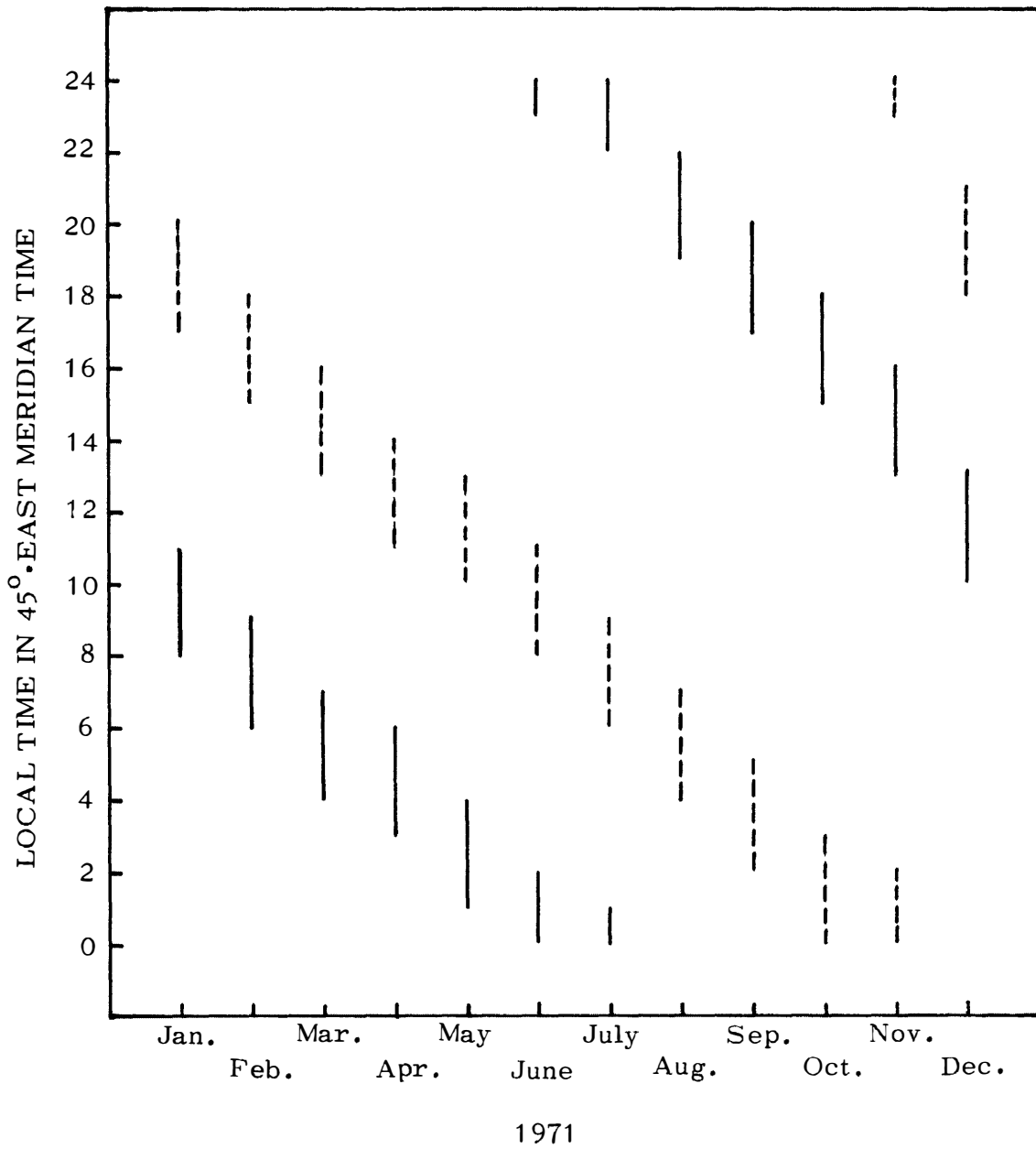


Fig. 1. Monthly range of the maximum values (——) and the minimum values (-----) of cosmic noise power at Syowa Station.

JAN 1971

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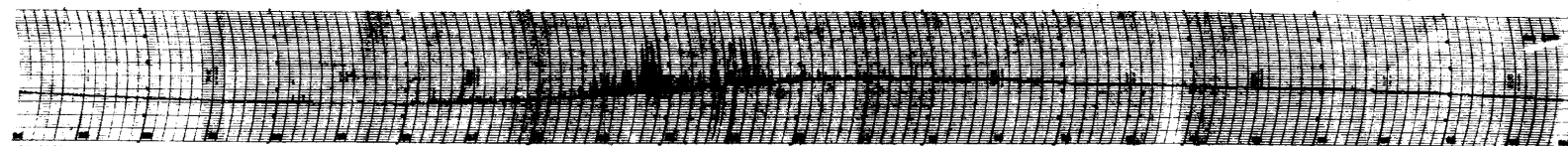
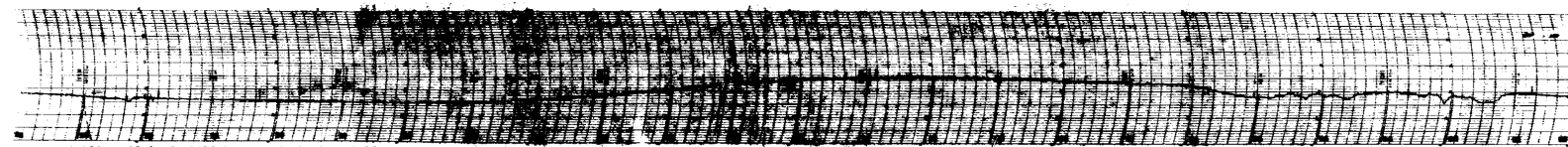
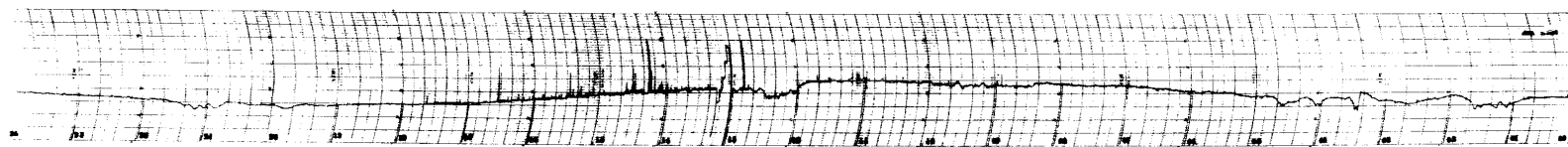
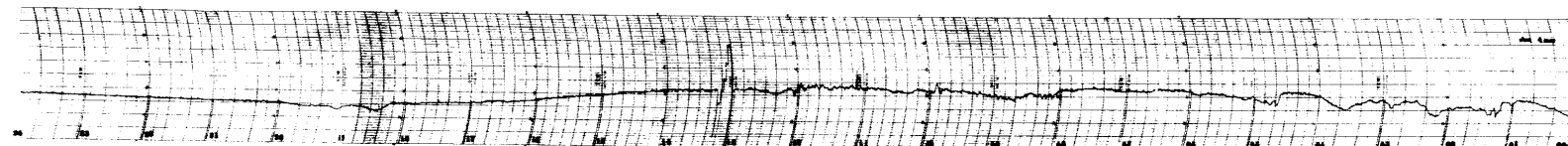
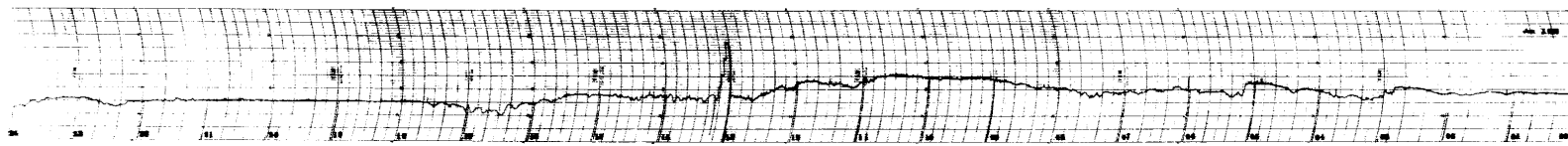
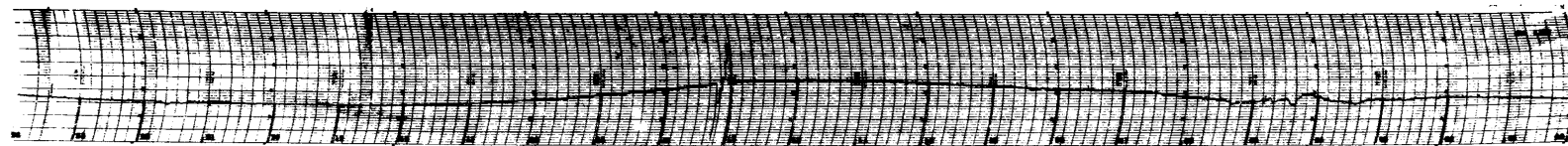
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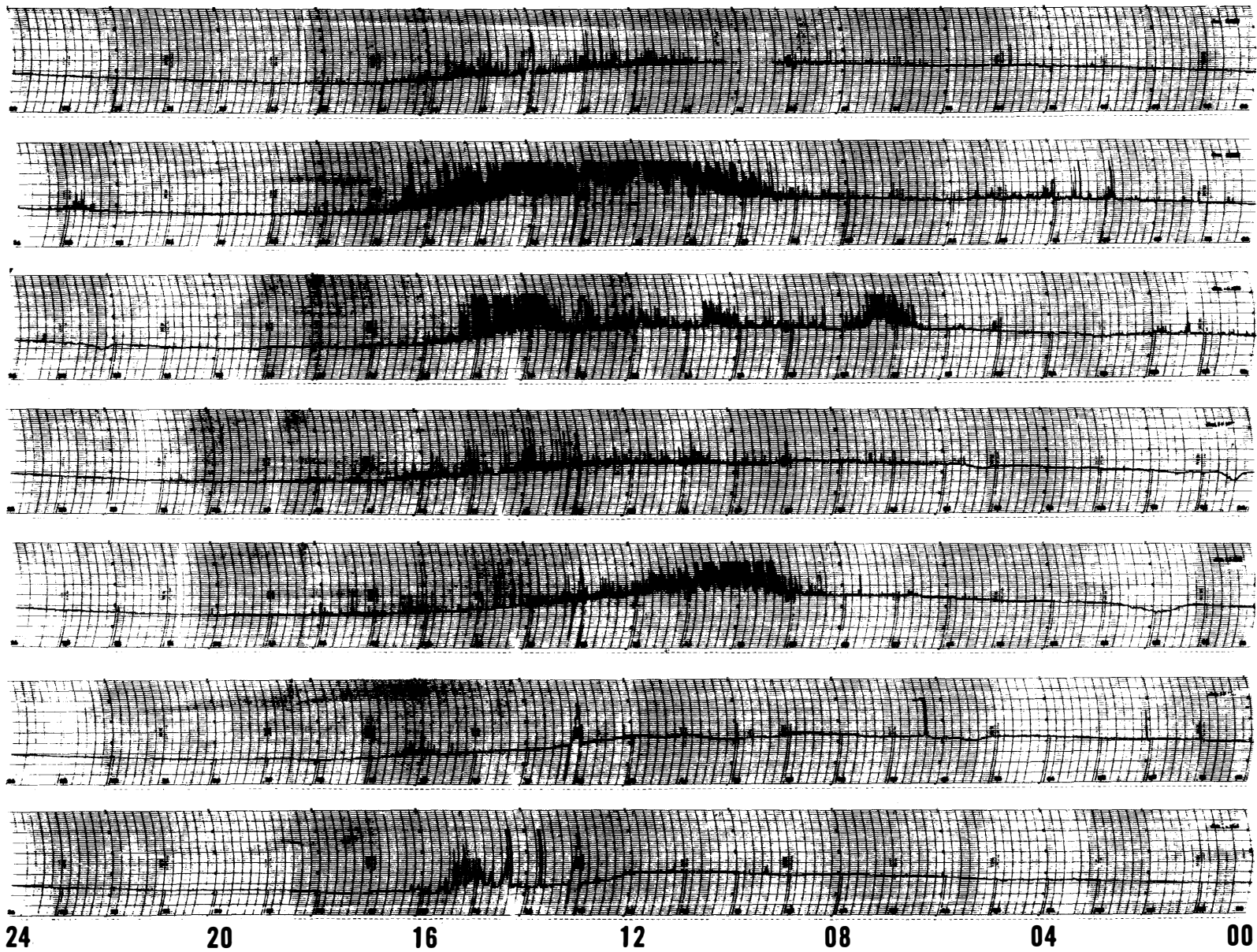
24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JAN 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JAN 1971

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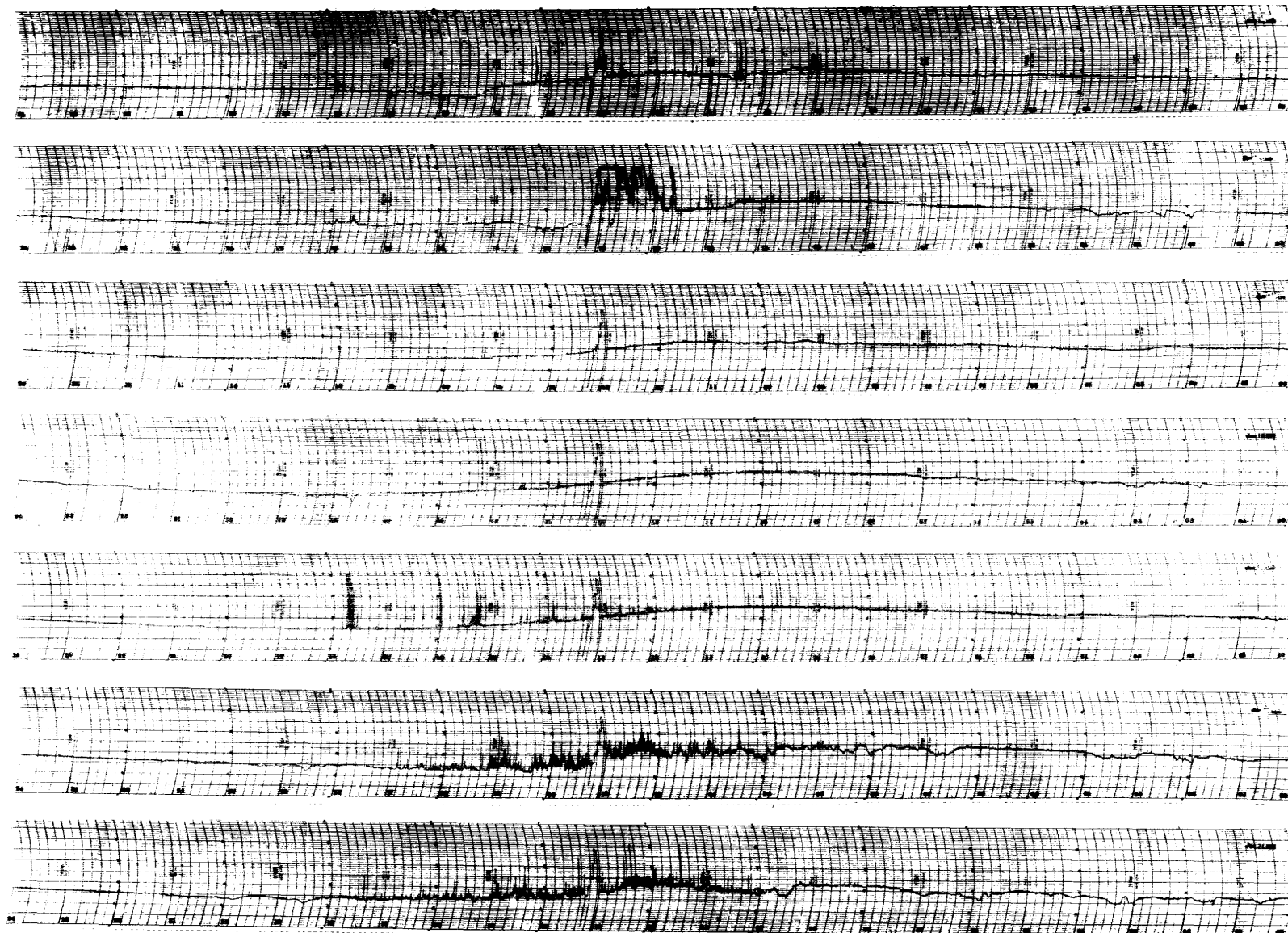
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

- 6 -

JAN 1971

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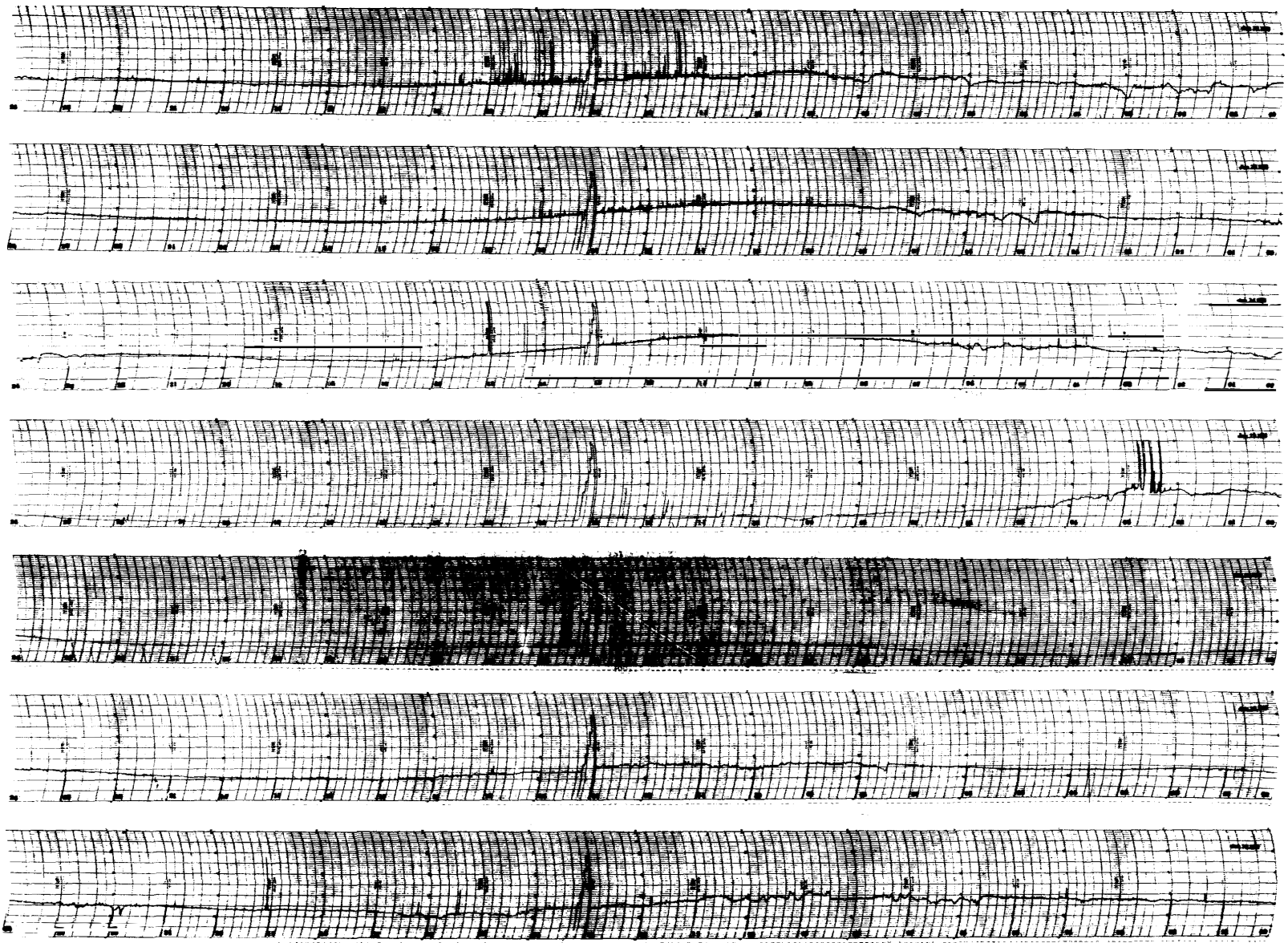
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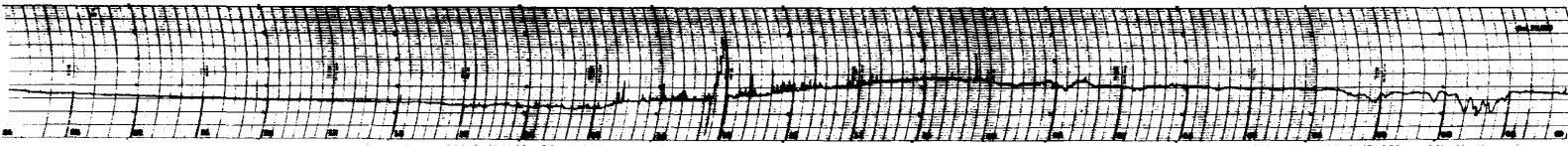
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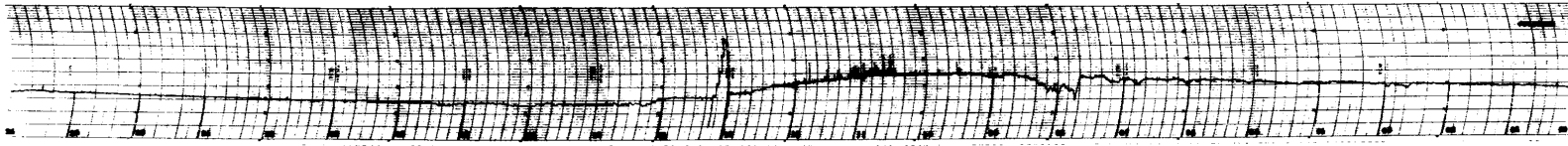
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45° EAST MERIDIAN TIME IN HOURS

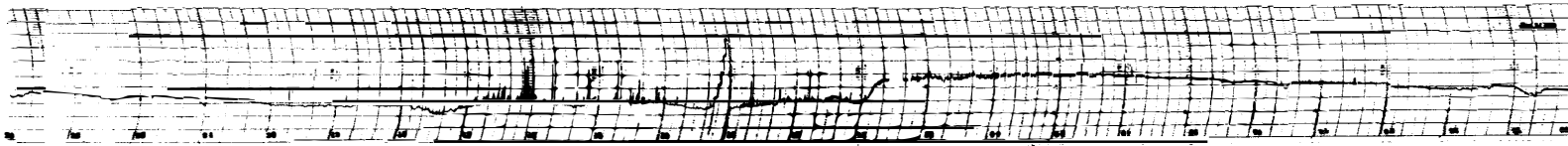
30MHz COSMIC NOISE



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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

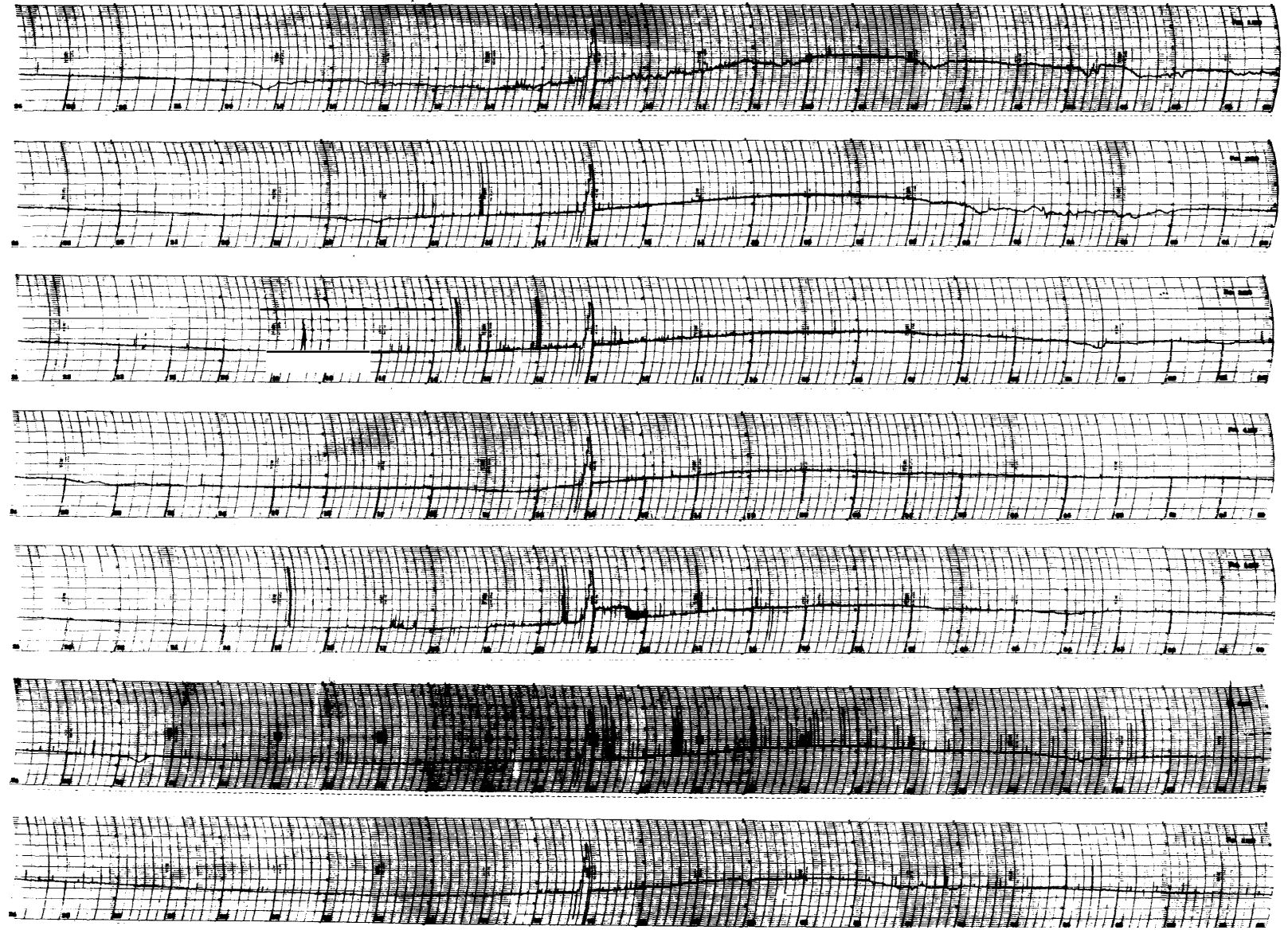
JAN 1971

Cosmic noise level obscured or equipment malfunction.

- 8. 0925-1030 failure of equipment.
- 9. 0950-1600 interferences.
- 10. 1330-1500 "
- 12. 0920-1200 "
- 14. 1420-1600 "
- 16. 1140-1300 "

FEB 1971

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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

FEB 1971

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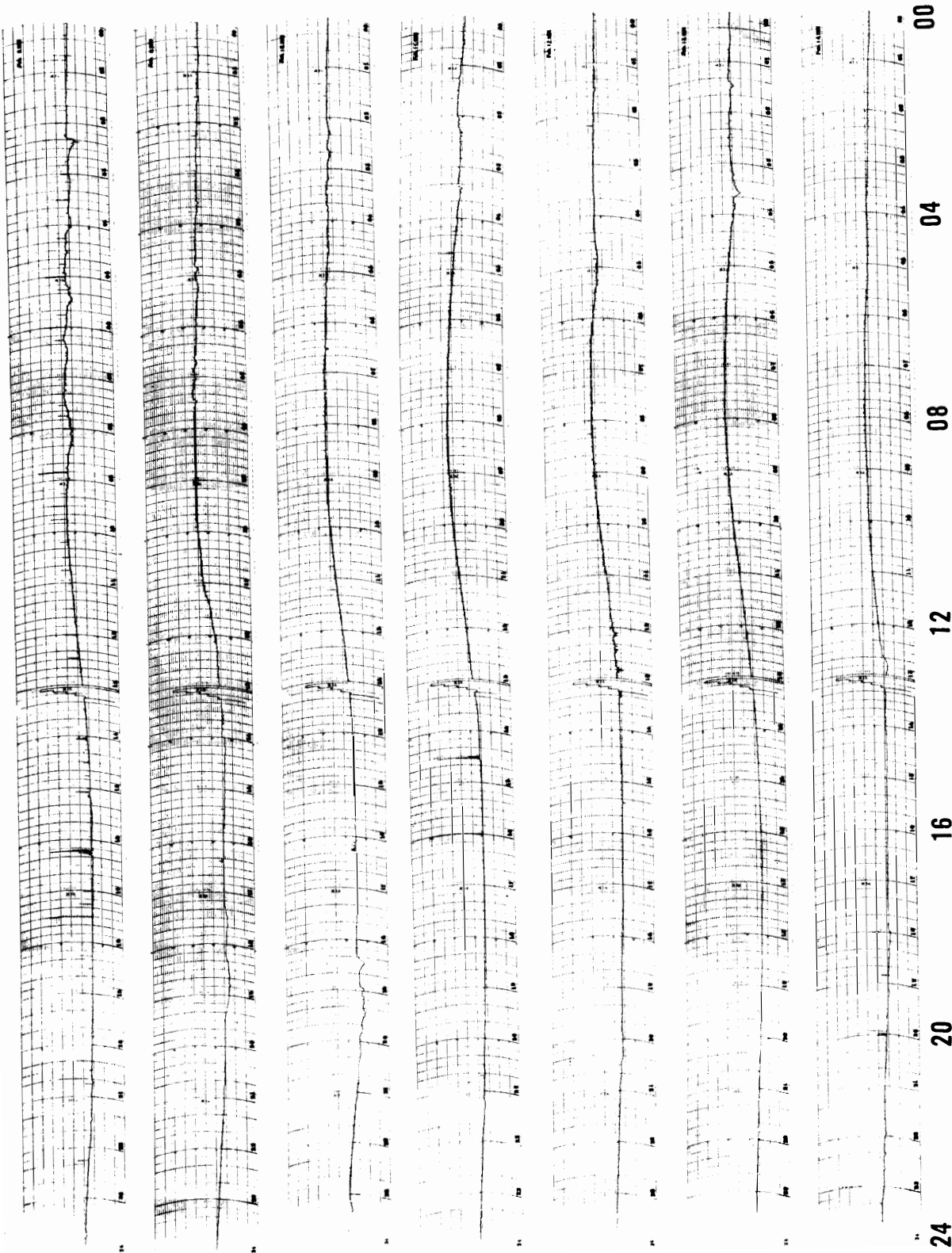
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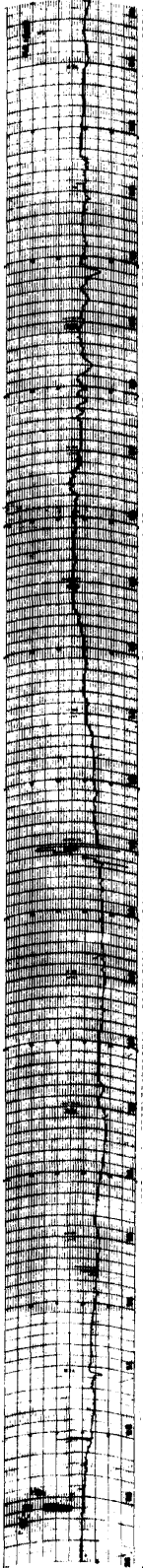


30MHz COSMIC NOISE

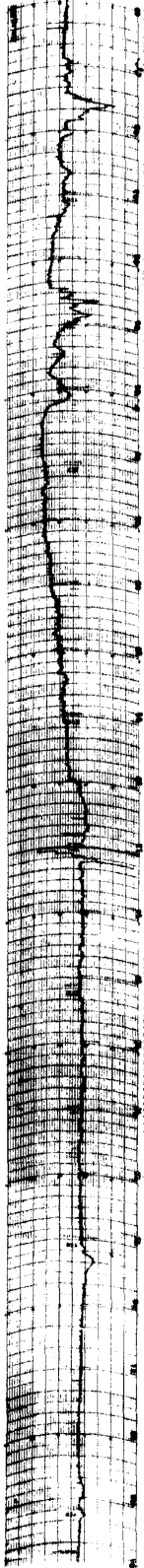
45° EAST MERIDIAN TIME IN HOURS

FEB 1971

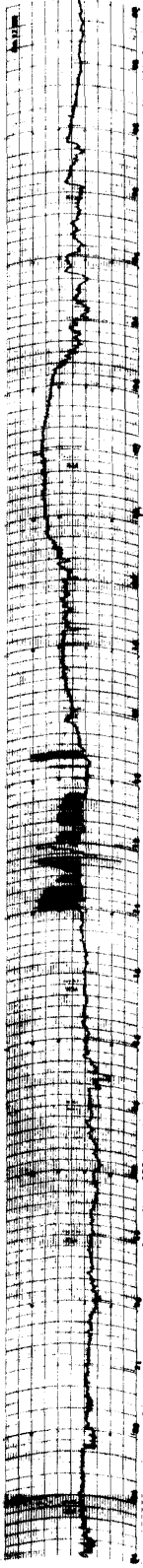
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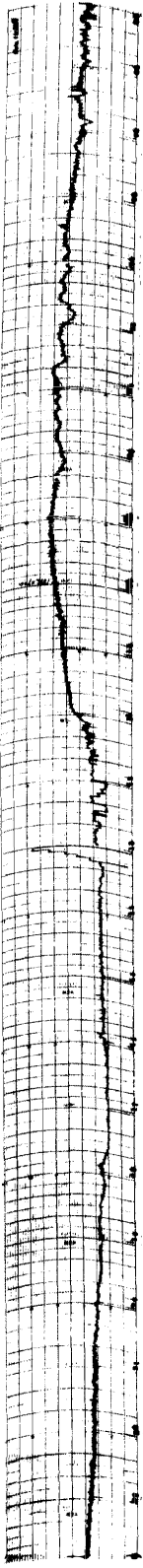
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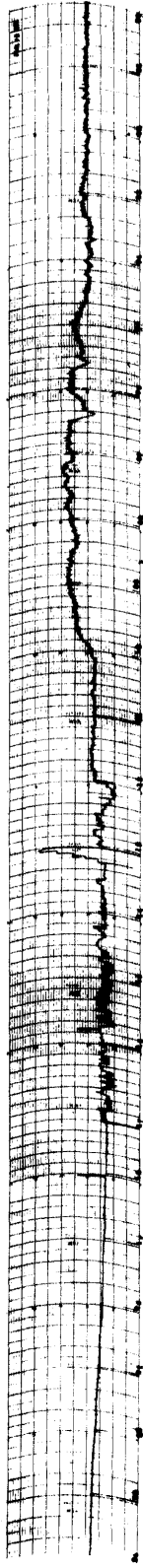
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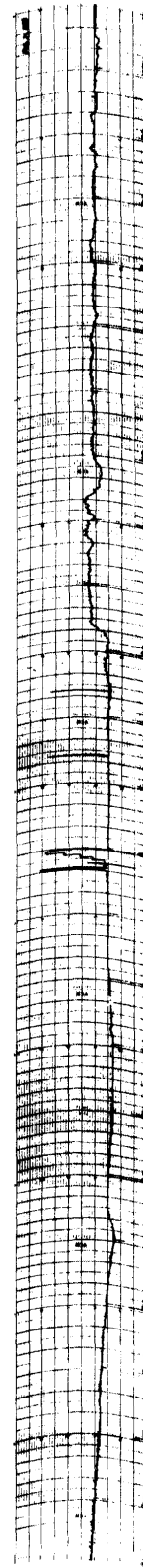
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS 30MHZ COSMIC NOISE

FEB 1971

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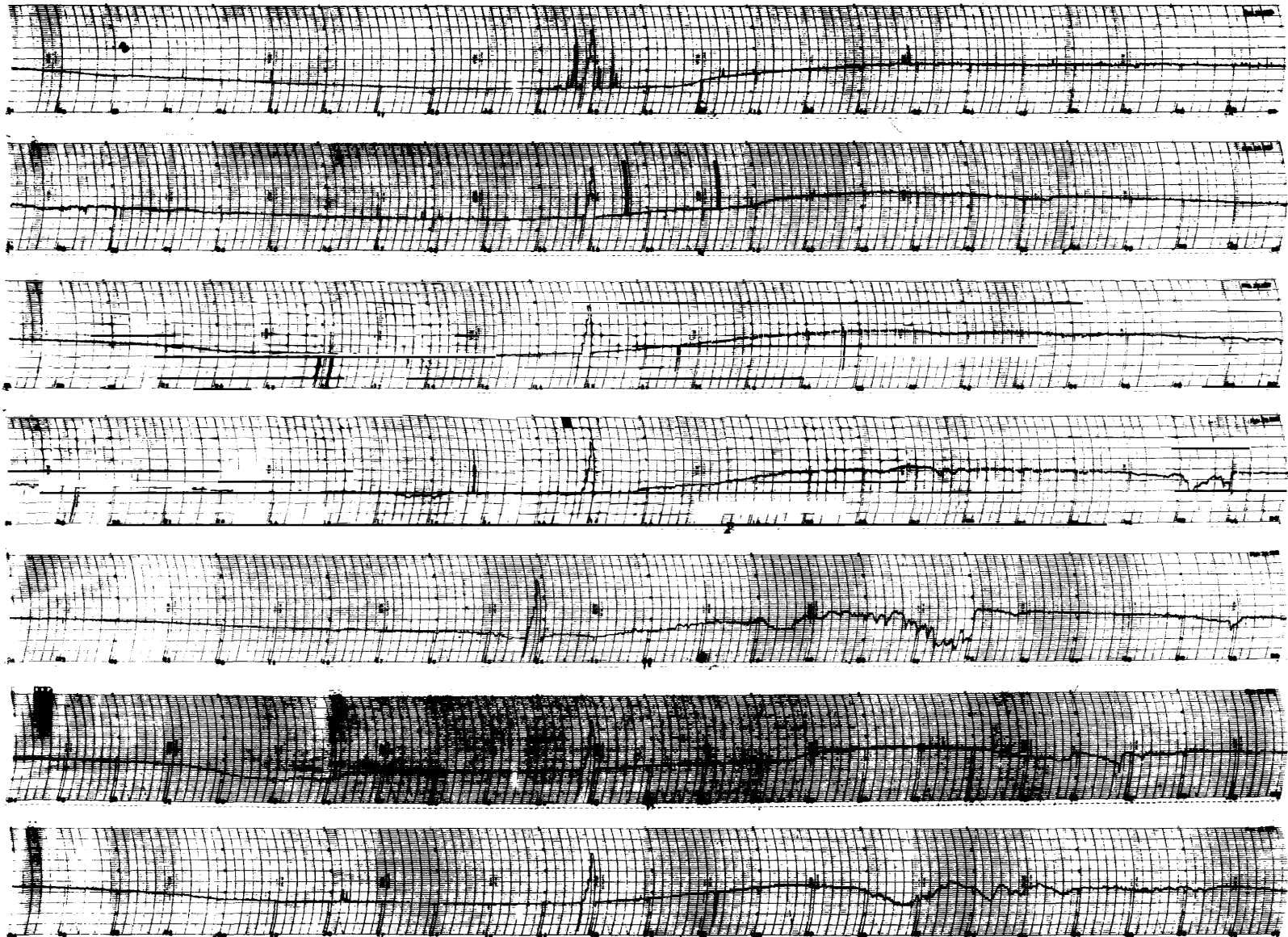
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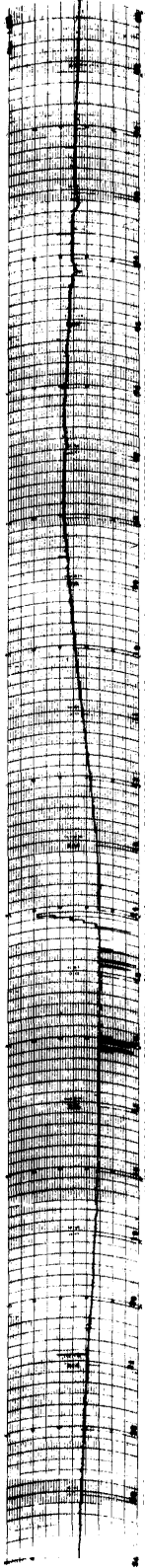
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45° EAST MERIDIAN TIME IN HOURS

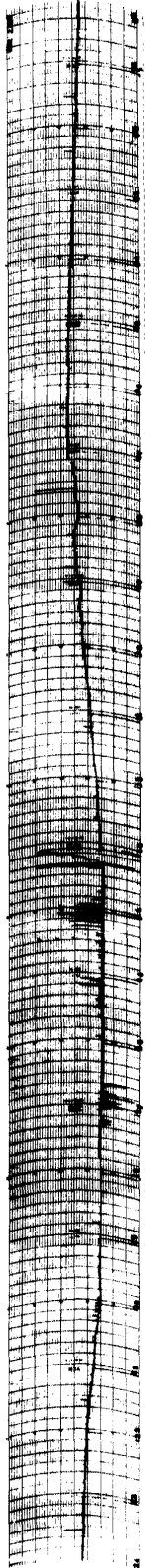
30MHz COSMIC NOISE

MAR 1971

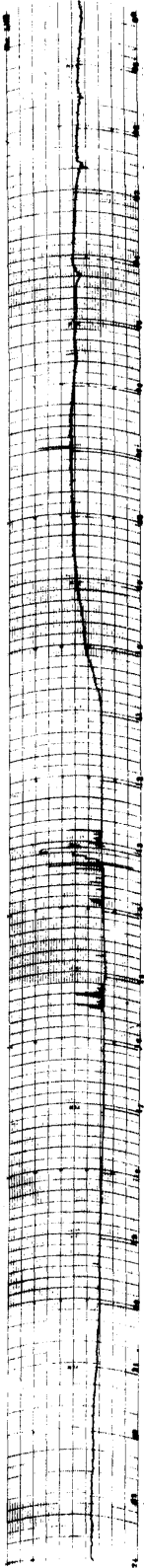
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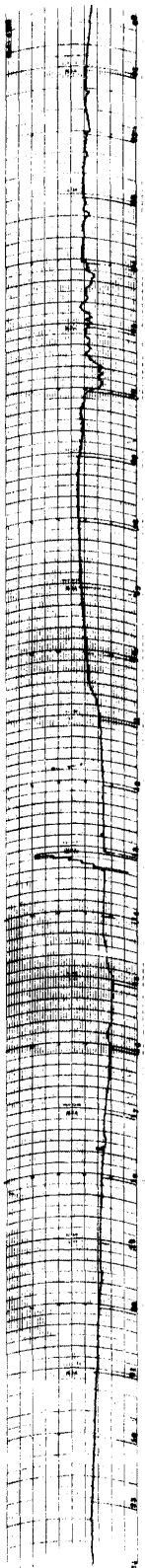
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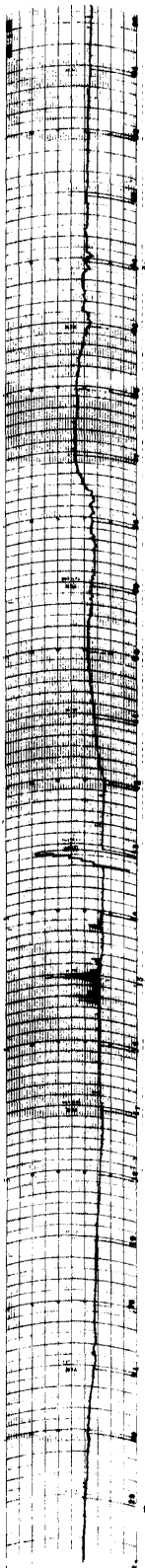
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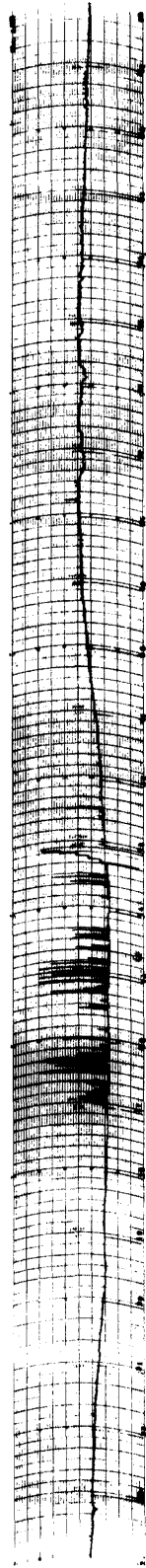
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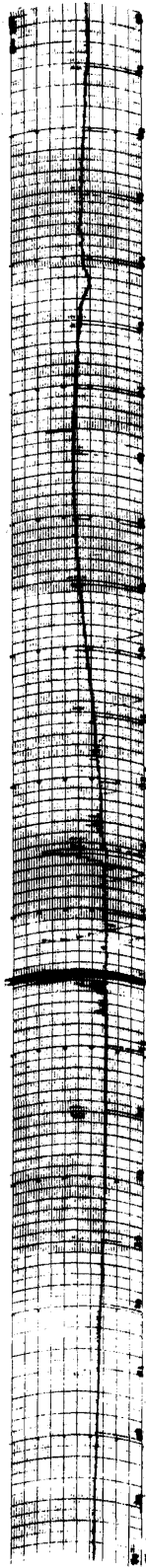
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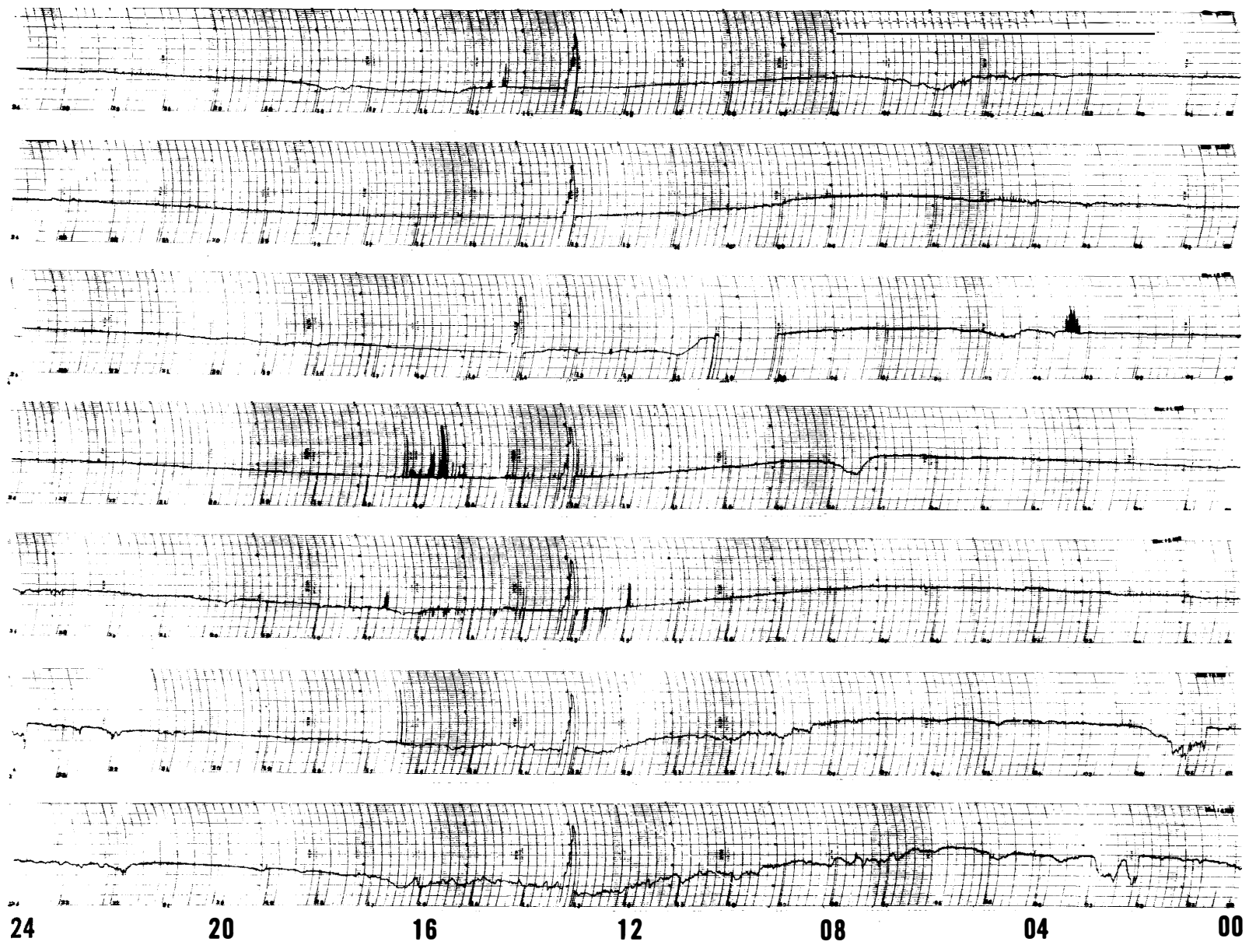


24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS 30MHz COSMIC NOISE

MAR 1971

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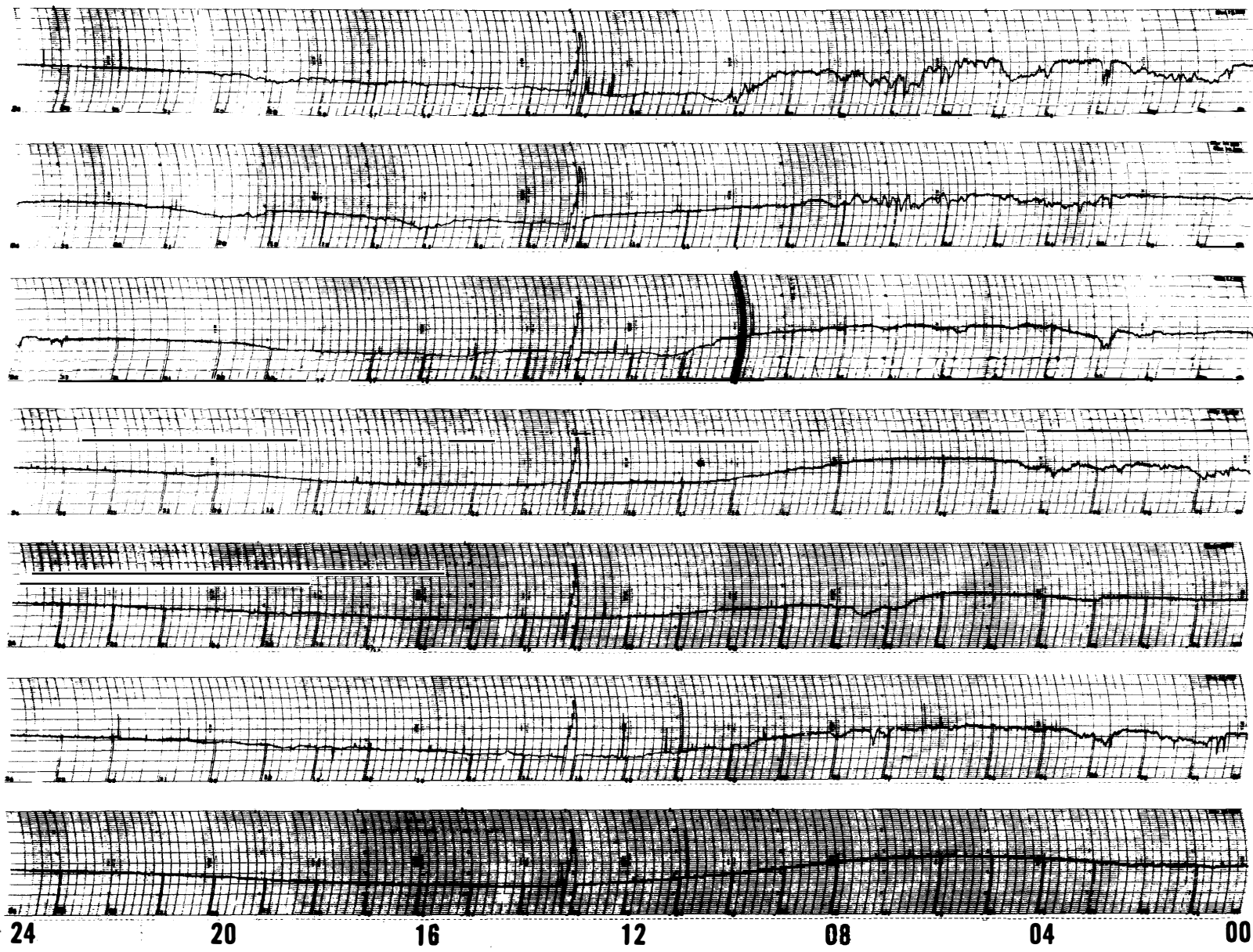


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

MAR 1971

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- 15 -

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

MAR 1971

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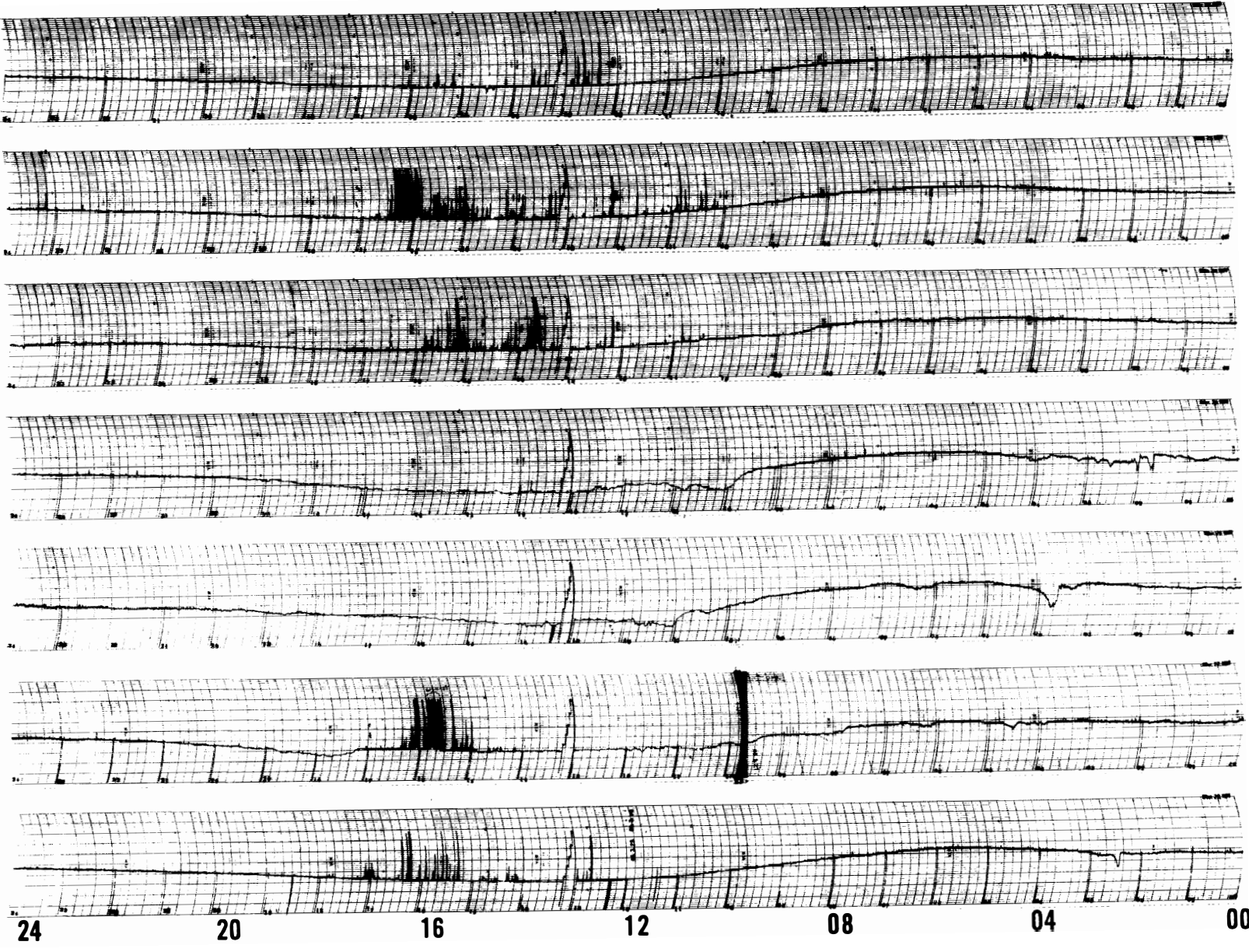
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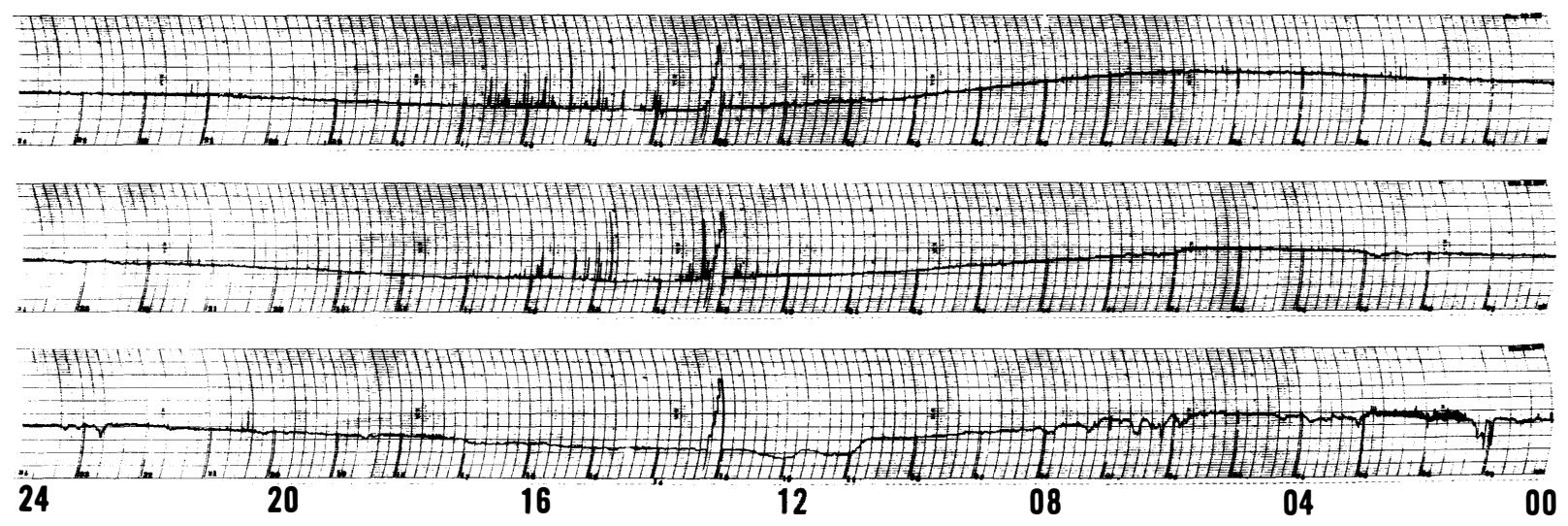


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

MAR 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.
10. 0910-1020 failure of equipment.

APR 1971

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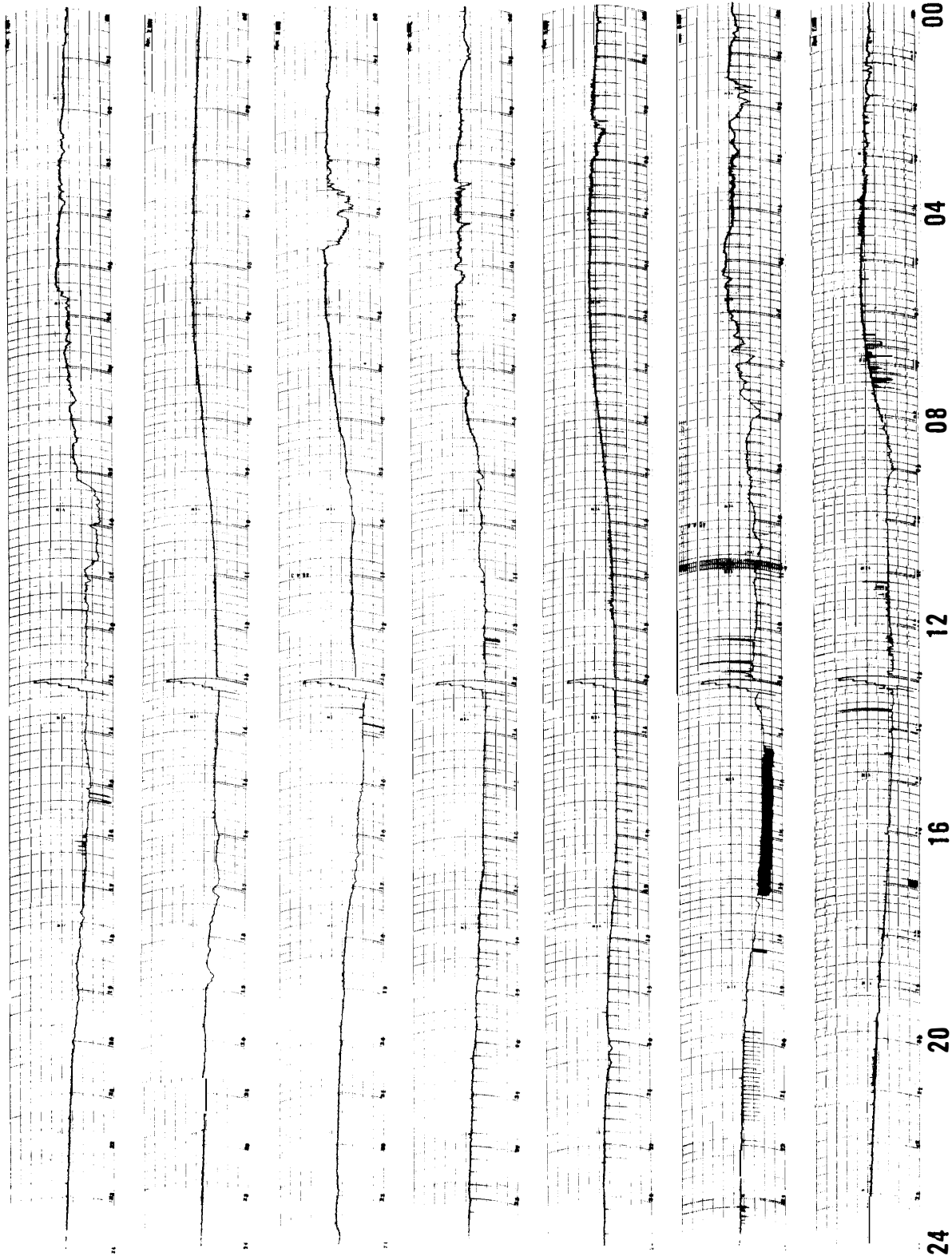
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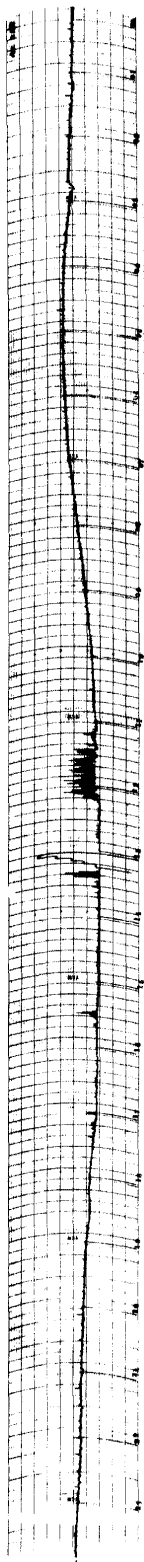


30MHZ COSMIC NOISE

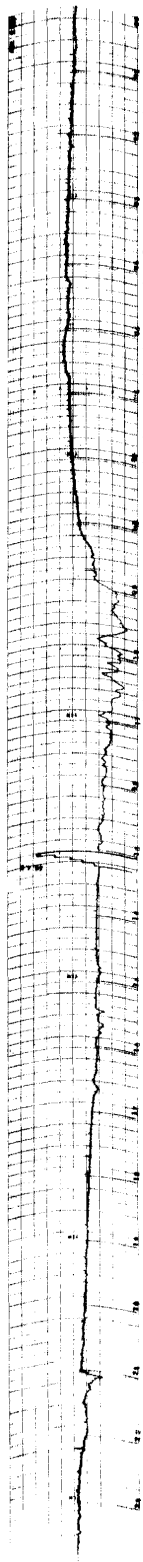
45° EAST MERIDIAN TIME IN HOURS

APR 1971

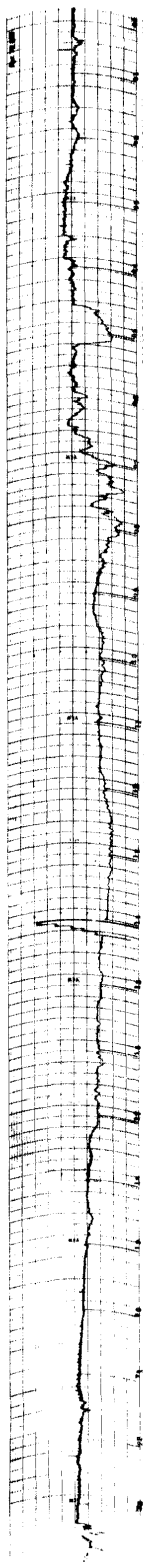
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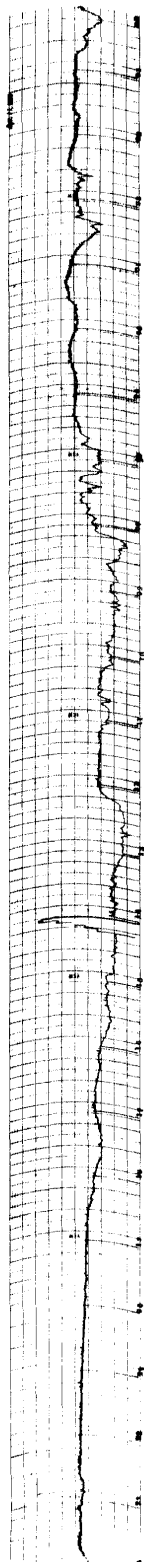
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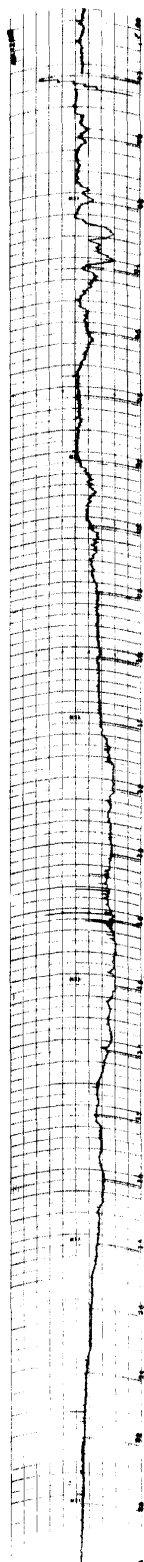
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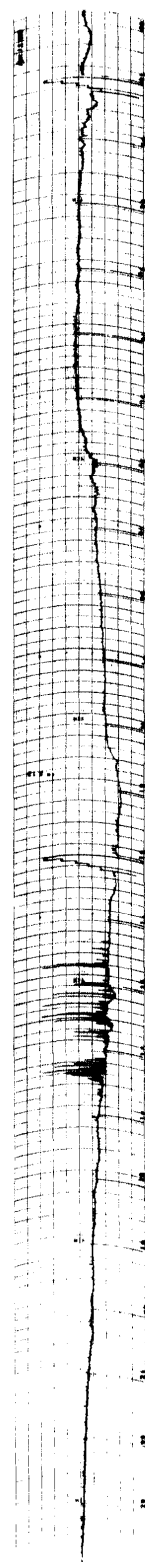
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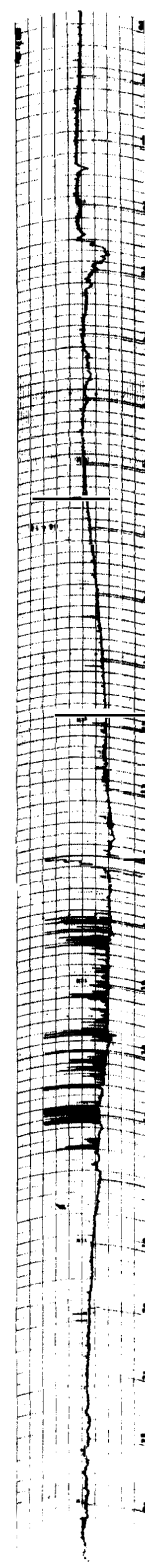
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24 20 16 12 08 04 00

30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

APR 1971

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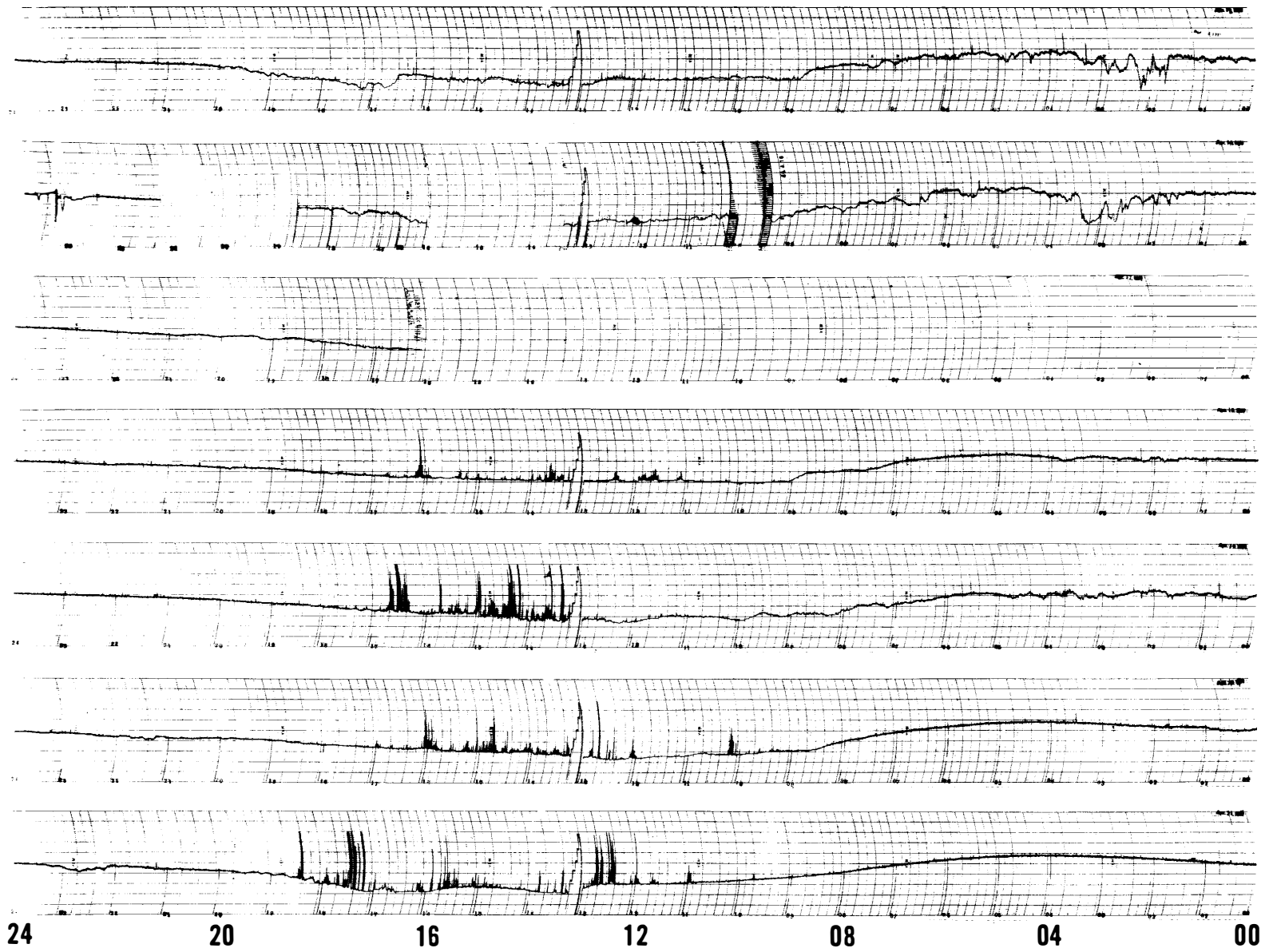
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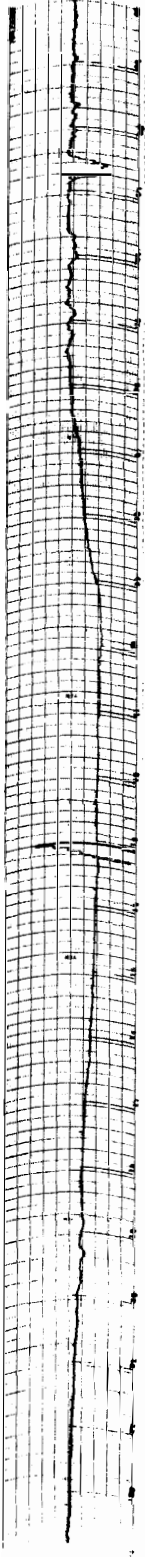


45° EAST MERIDIAN TIME IN HOURS

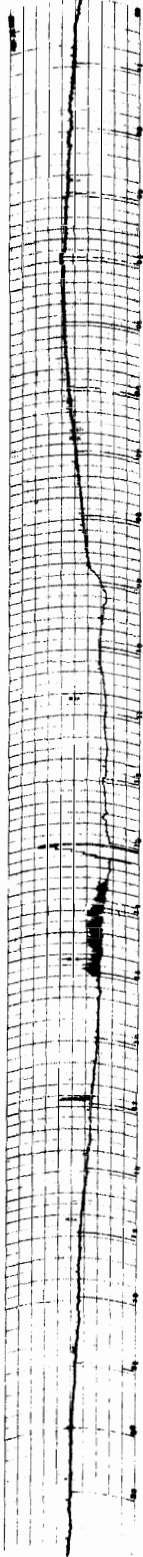
30MHz COSMIC NOISE

APR 1971

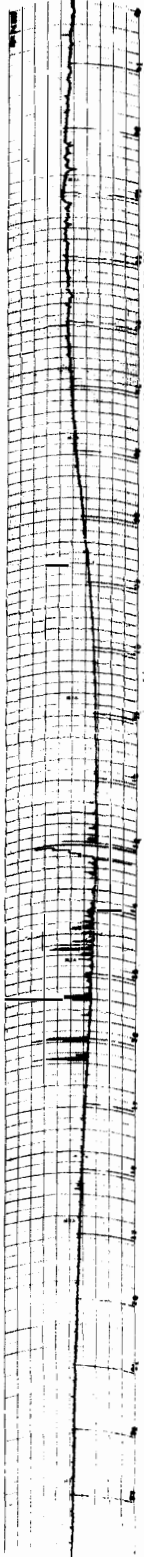
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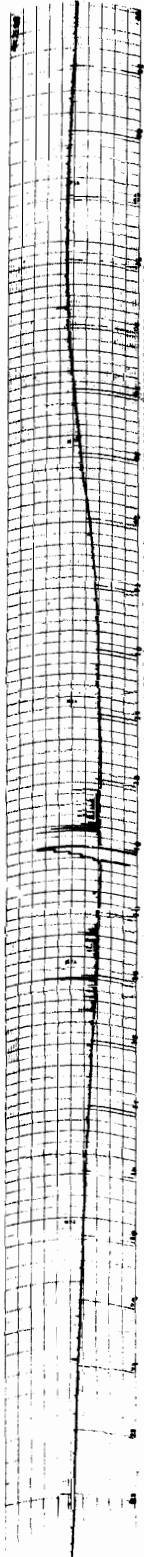
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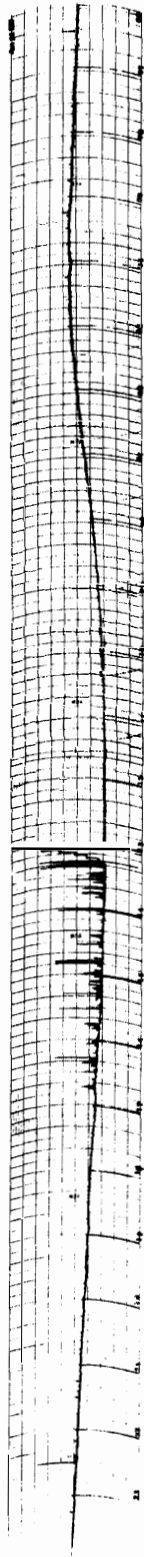
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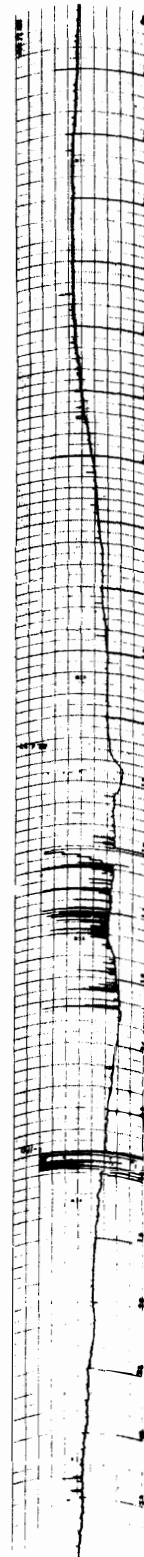
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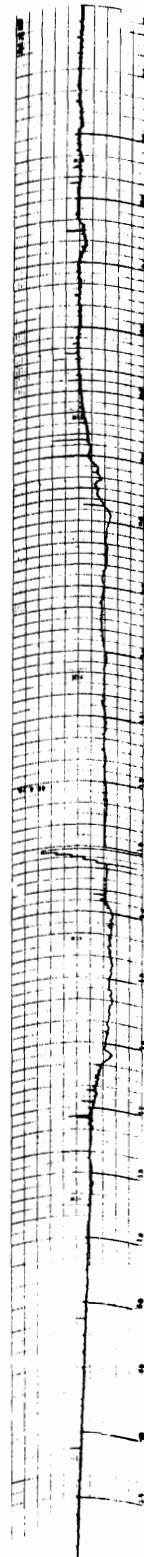
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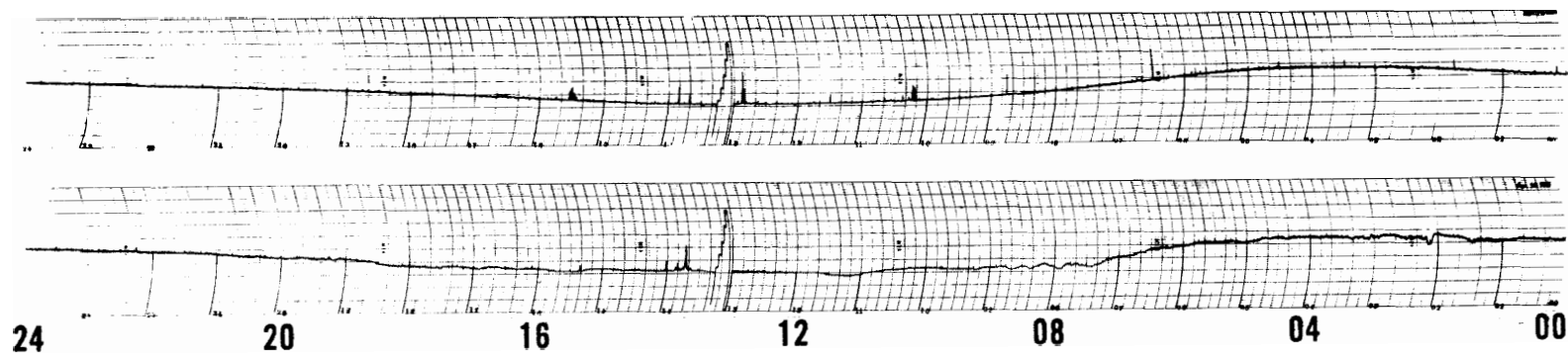
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45° EAST MERIDIAN TIME IN HOURS 30MHz COSMIC NOISE

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APR 1971



45° EAST MERIDIAN TIME IN HOURS

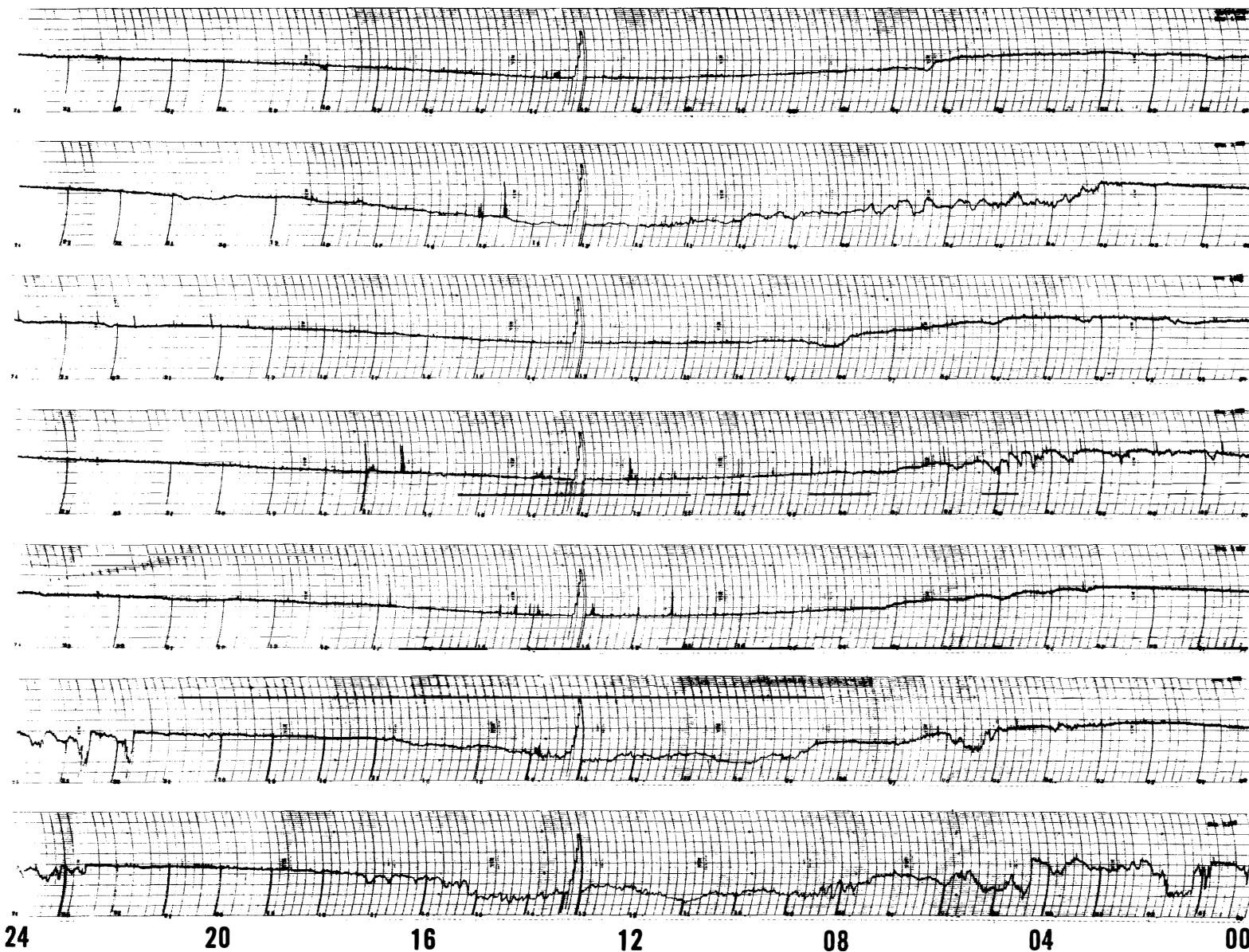
30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

- 16. 0930-1000 failure of equipment.
- 1320-1610 "
- 1840-2125 "
- 17. 0000-1620 "
- 27. 1740-1800 equipment test.

MAY 1971

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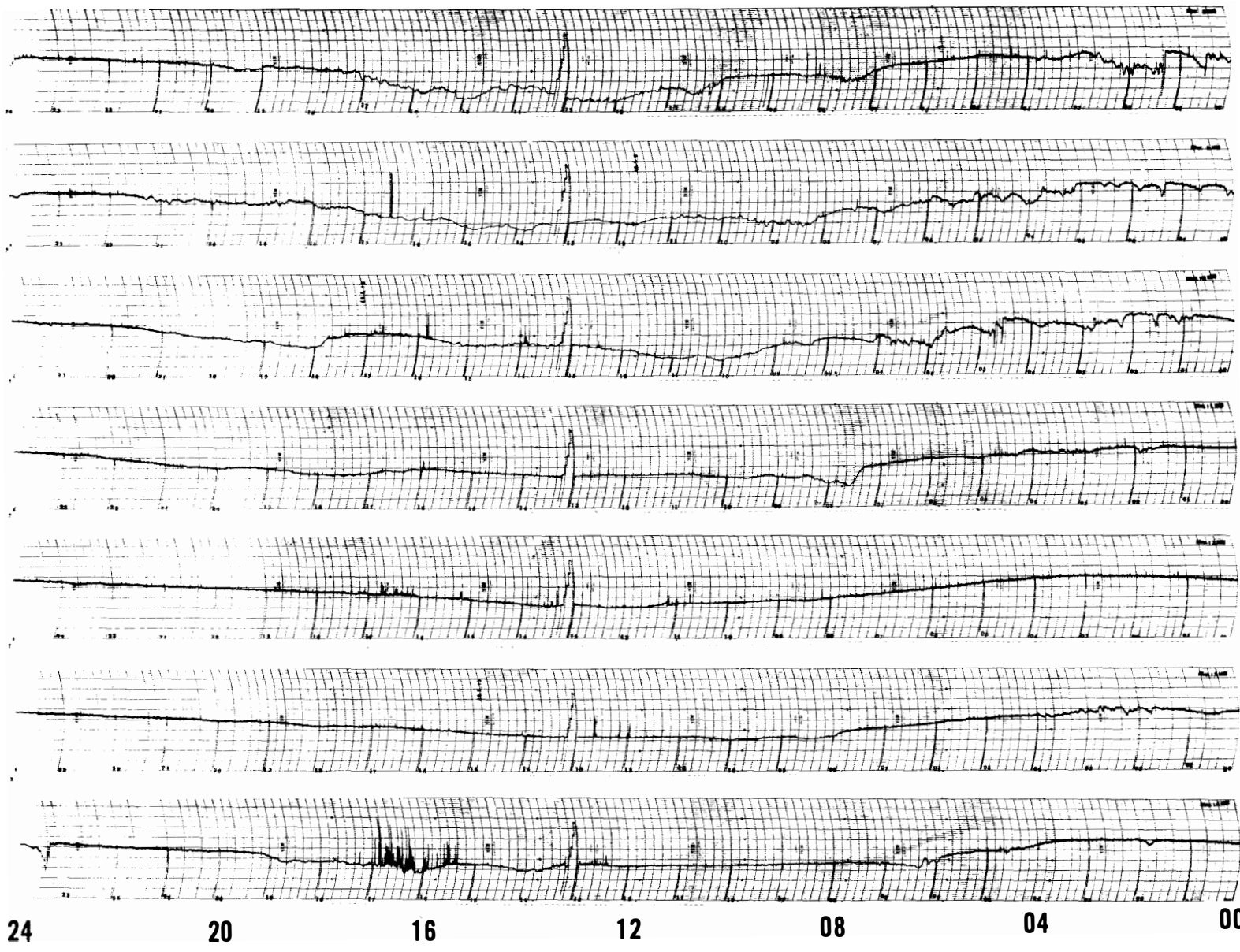


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

MAY 1971

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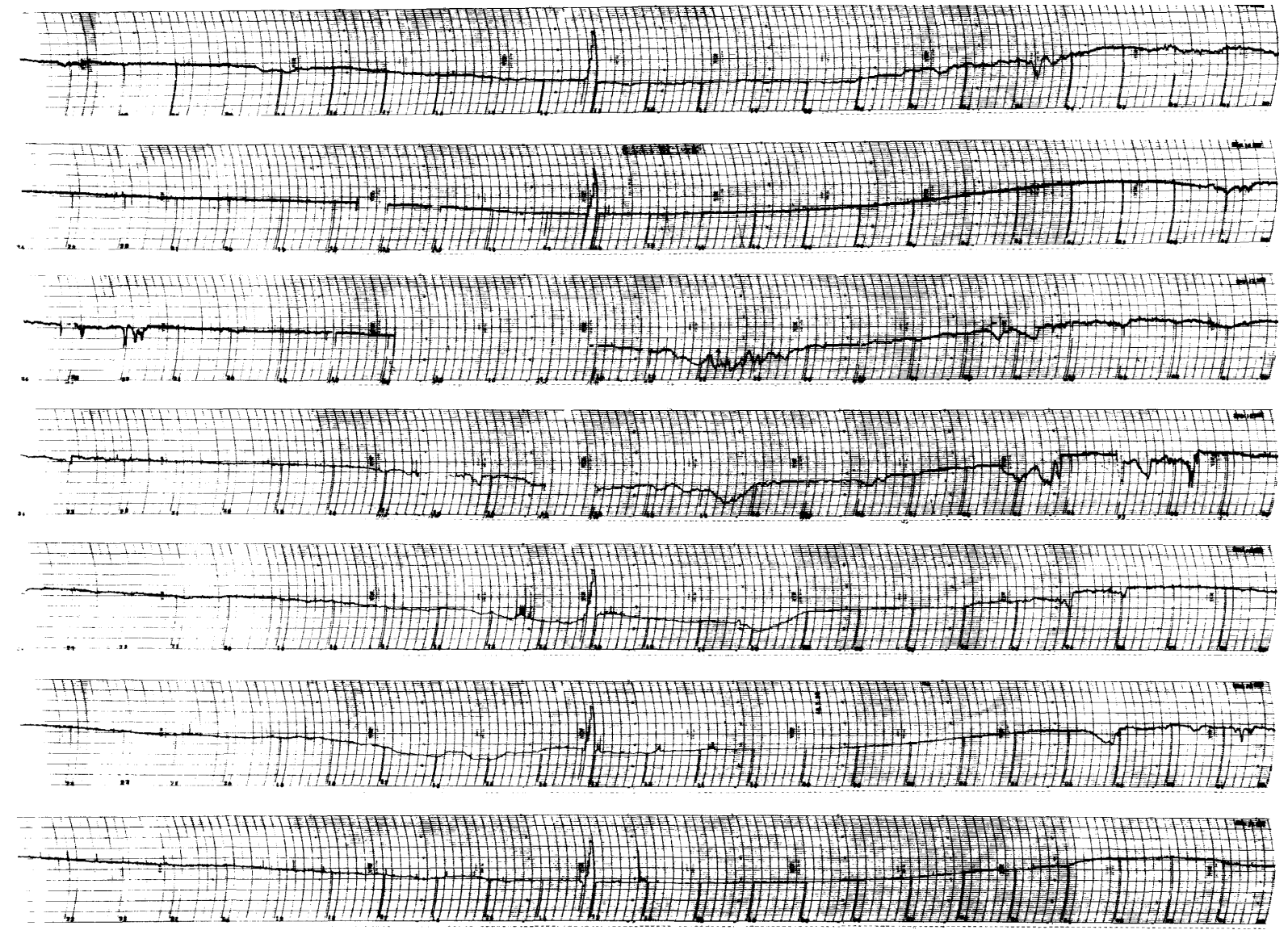


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

MAY 1971

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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

MAY 1971

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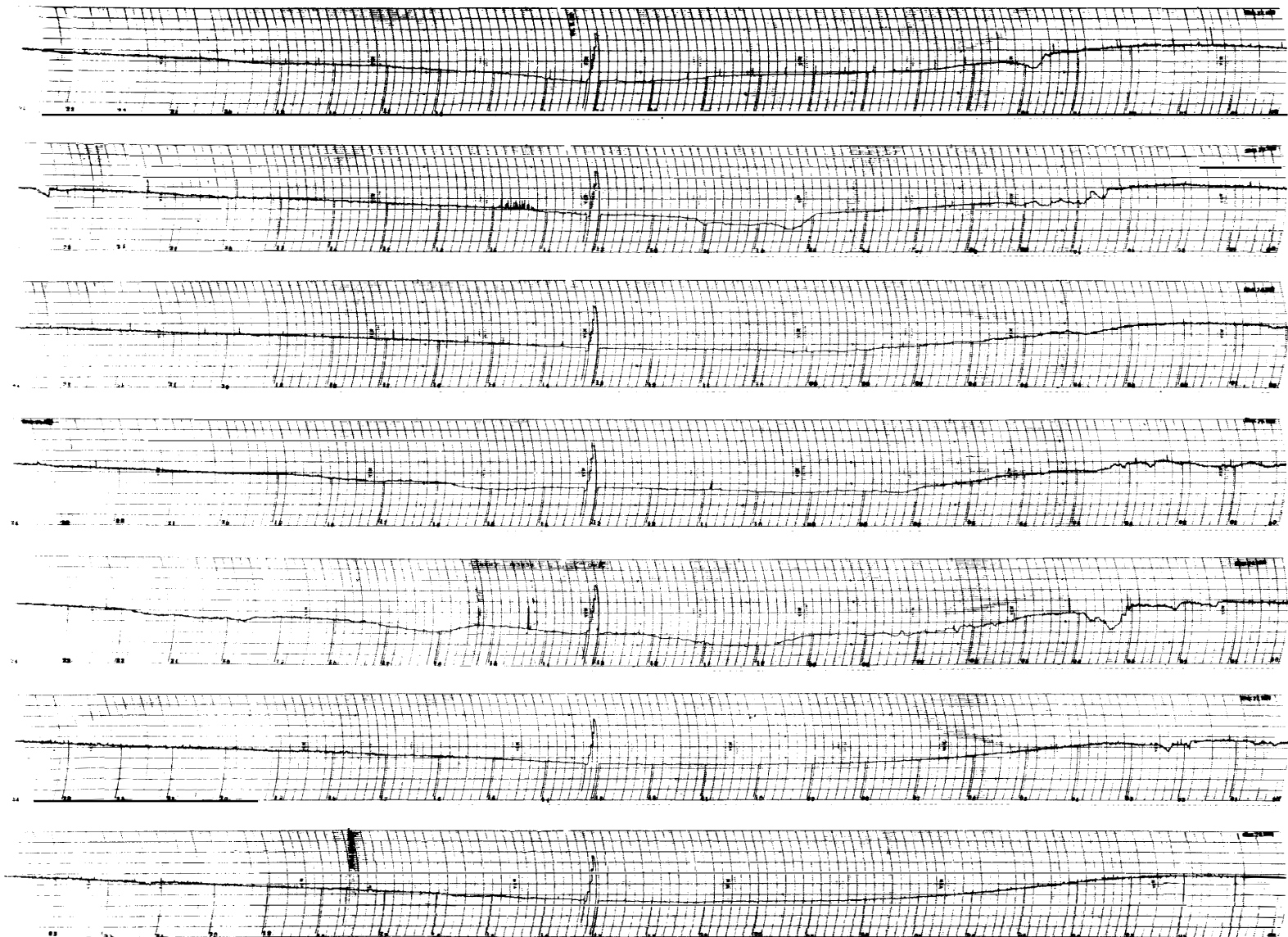
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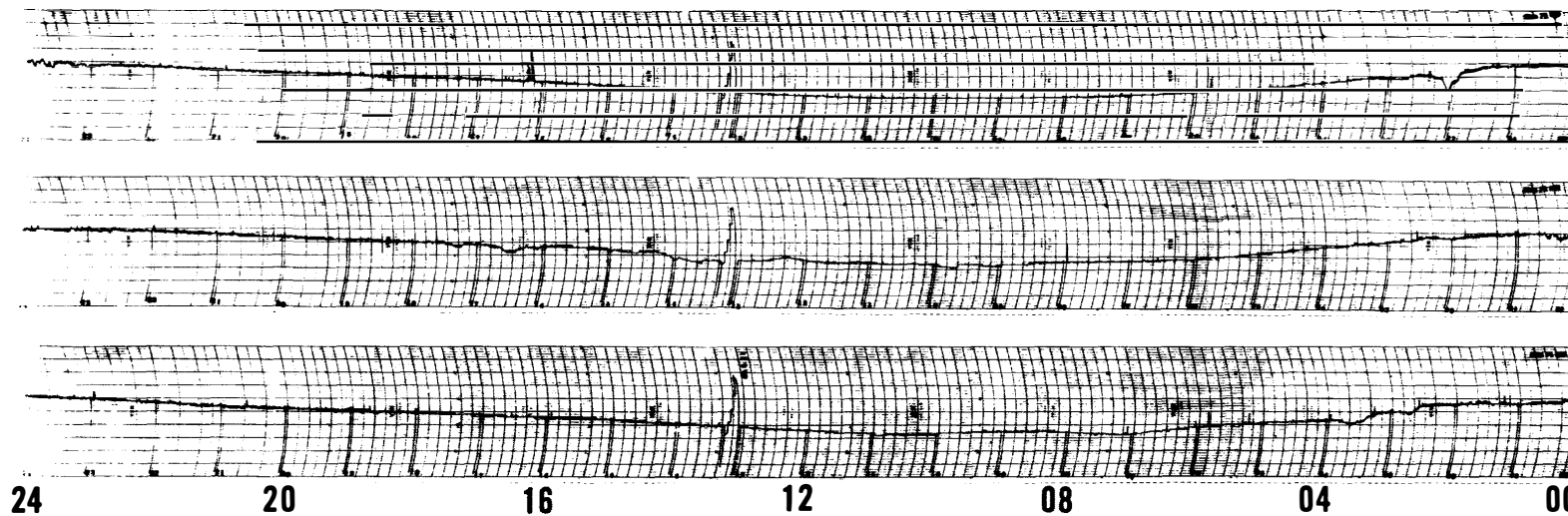
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE



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MAY 1971

45° EAST MERIDIAN TIME IN HOURS

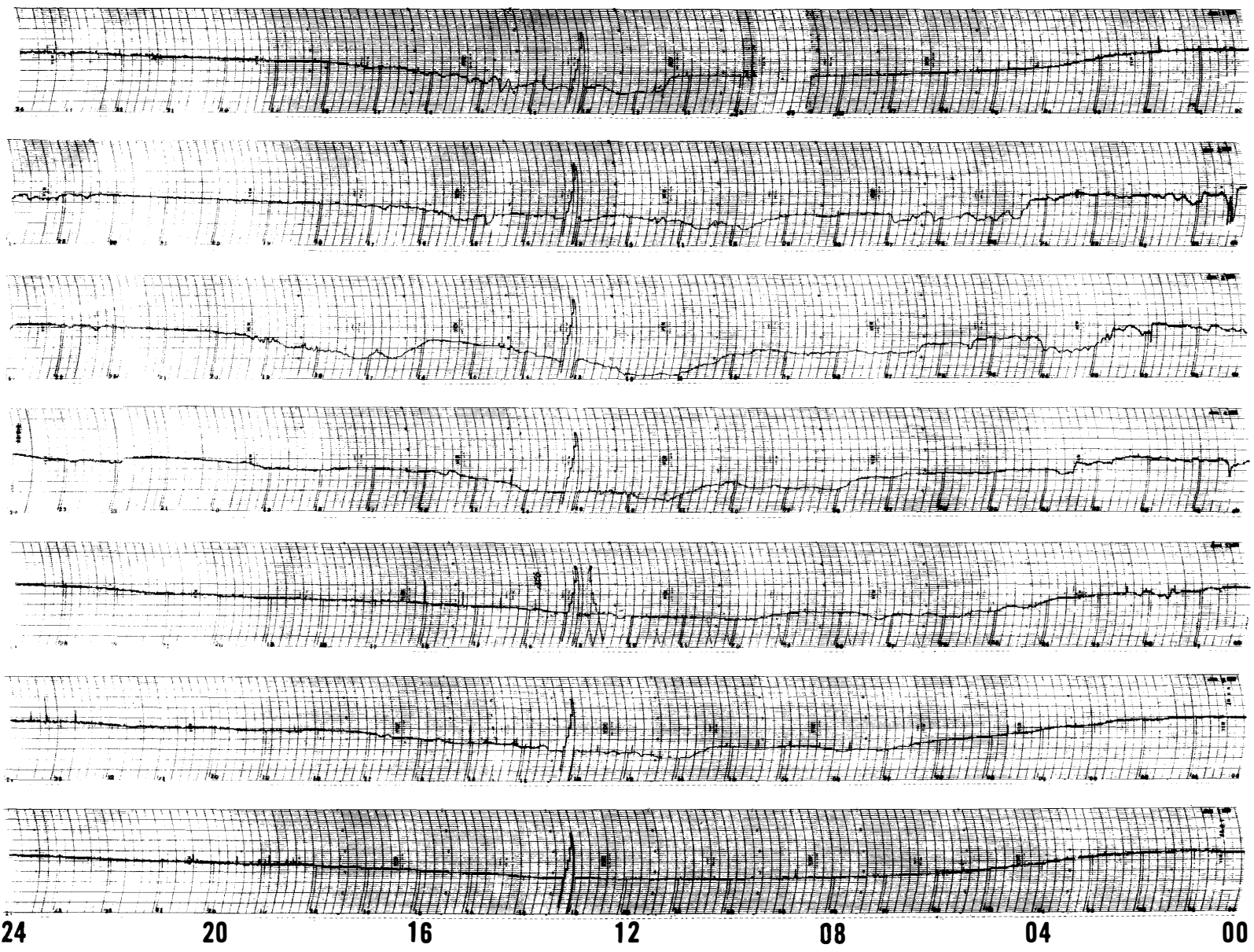
30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

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|-----|-----------|-----------------------|
| 16. | 1600-1610 | failure of equipment. |
| | 1700-1735 | " |
| 17. | 1200-1210 | " |
| | 1300-1655 | " |
| | 2300-2315 | " |
| 18. | 1300-1400 | " |
| | 1540-1625 | " |

JUNE 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JUNE 1971

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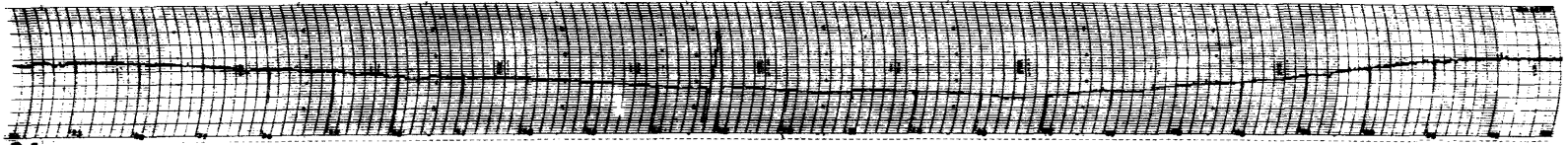
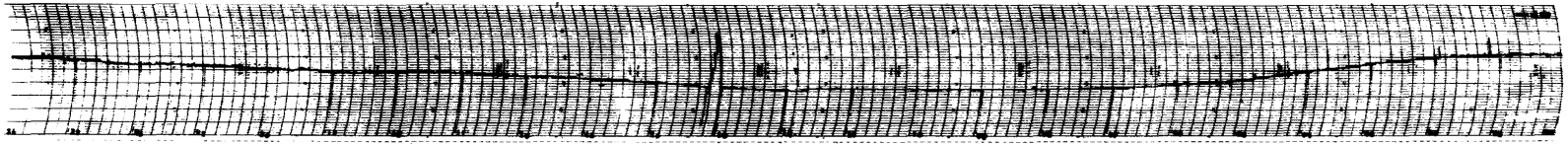
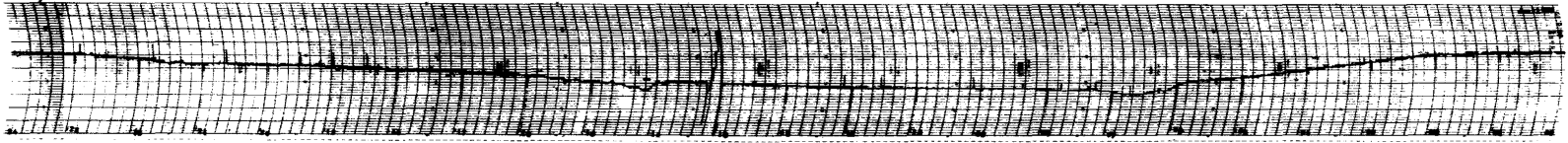
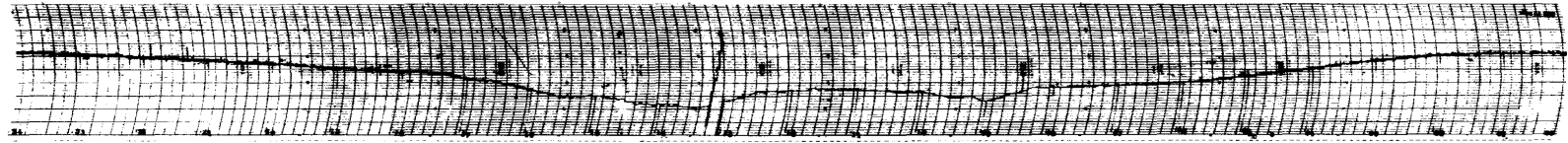
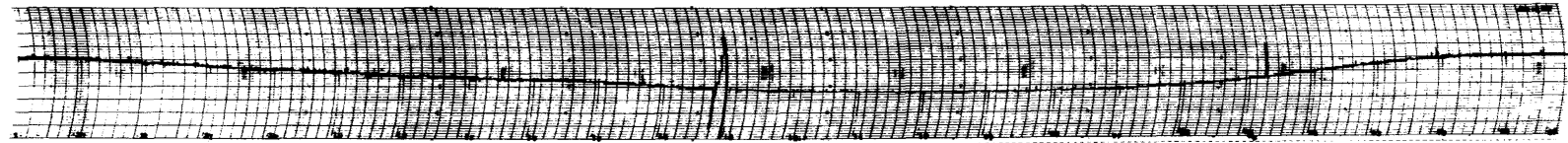
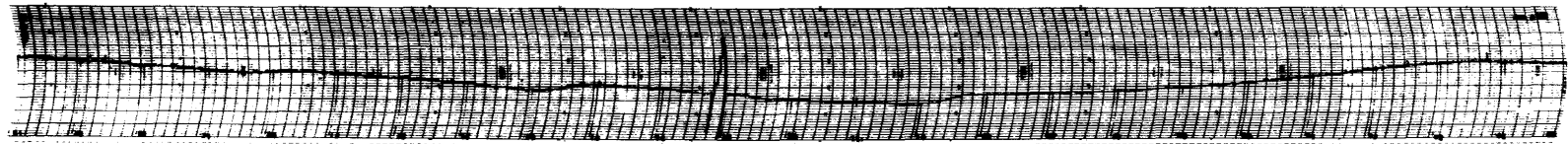
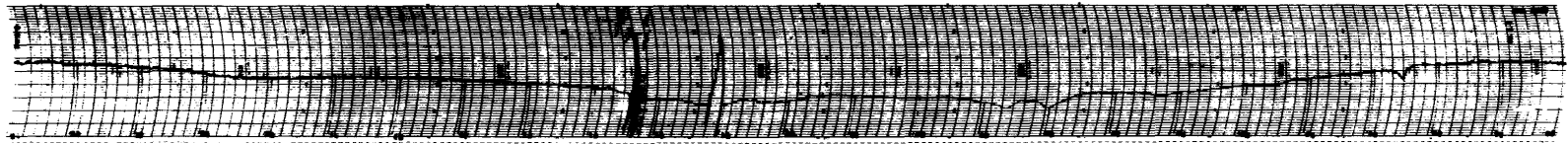
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JUNE 1971

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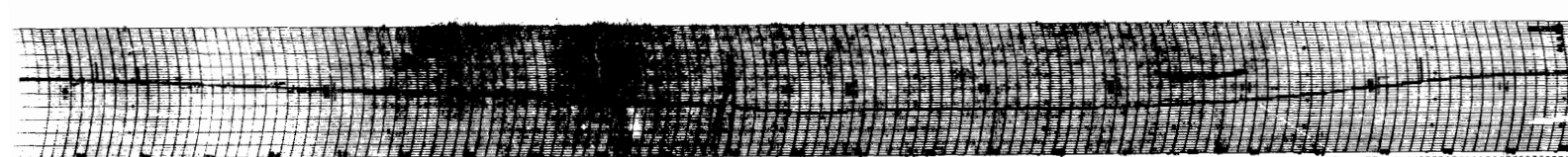
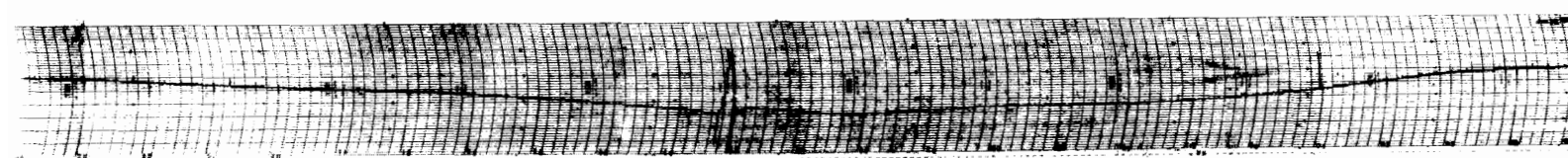
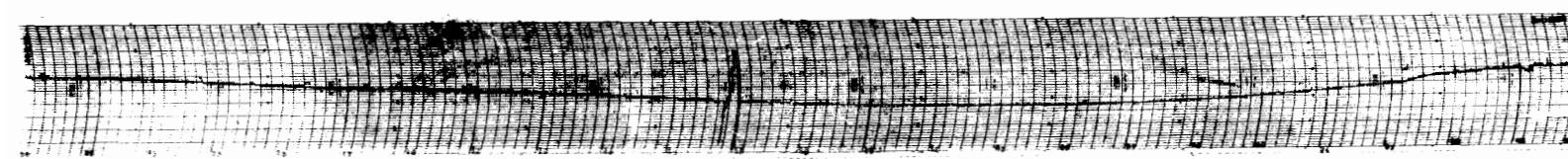
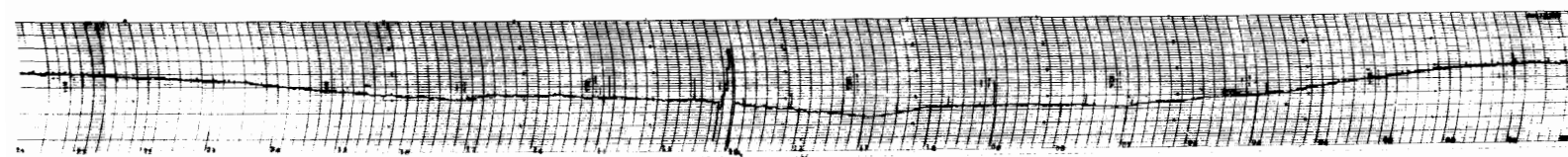
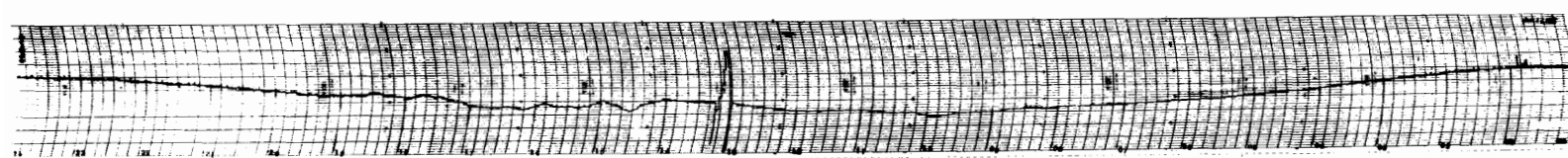
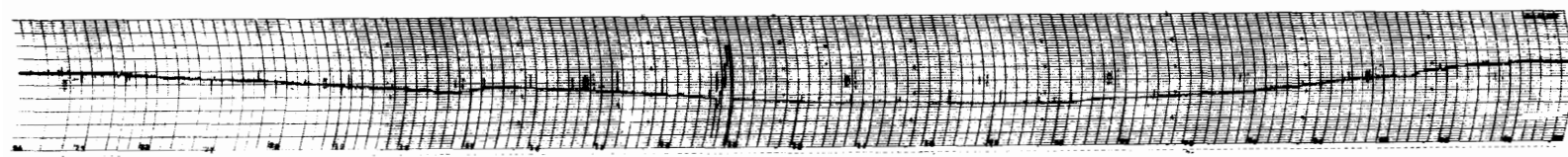
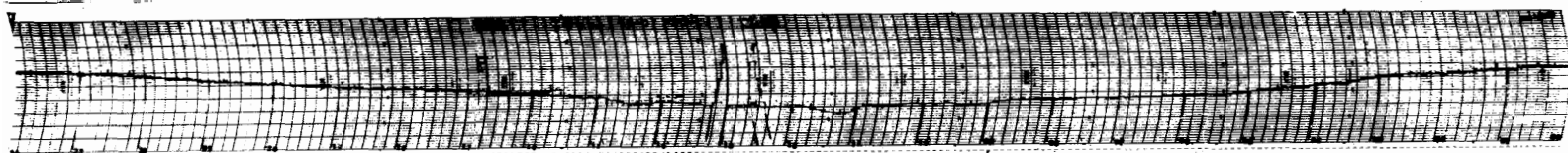
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JUNE 1971

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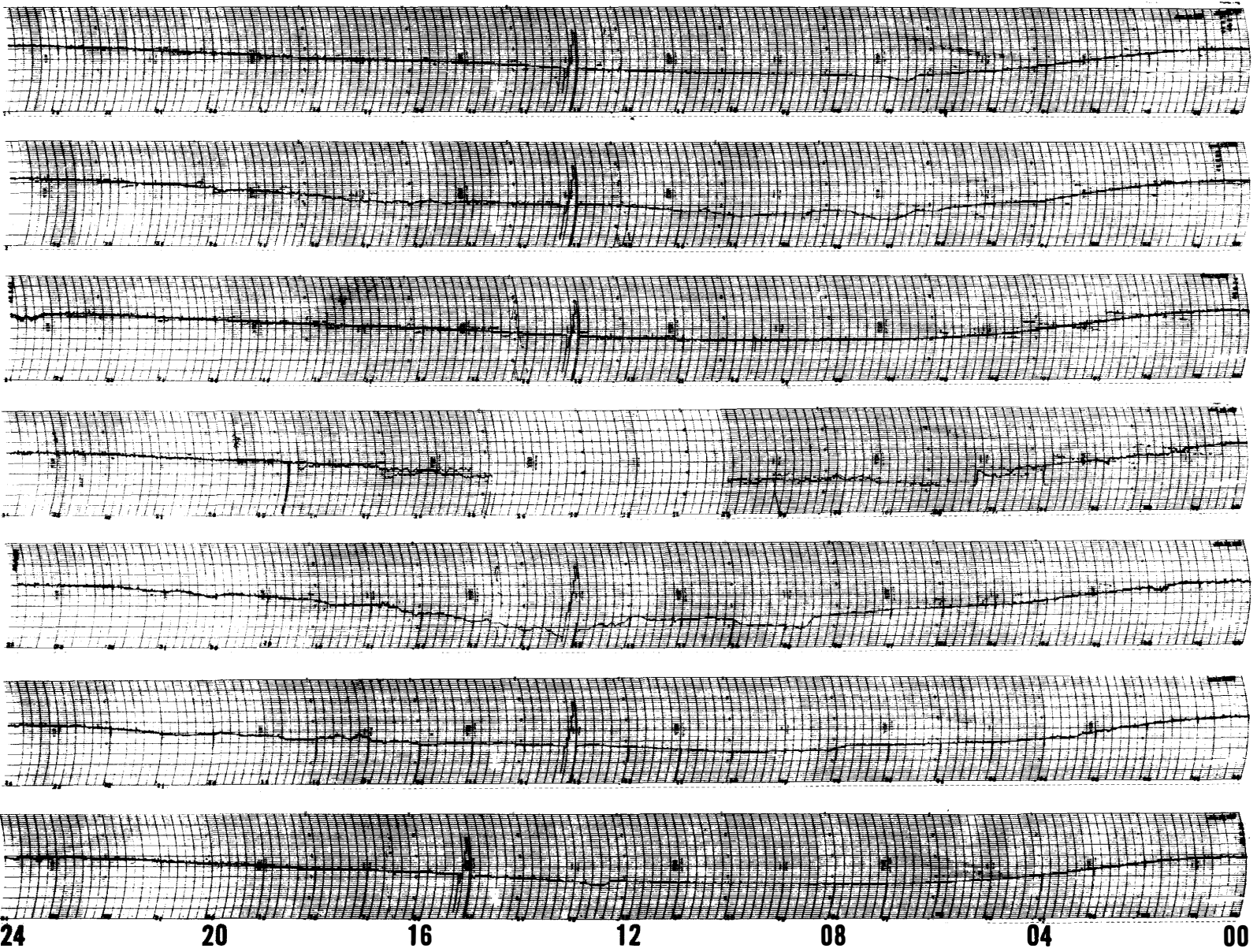
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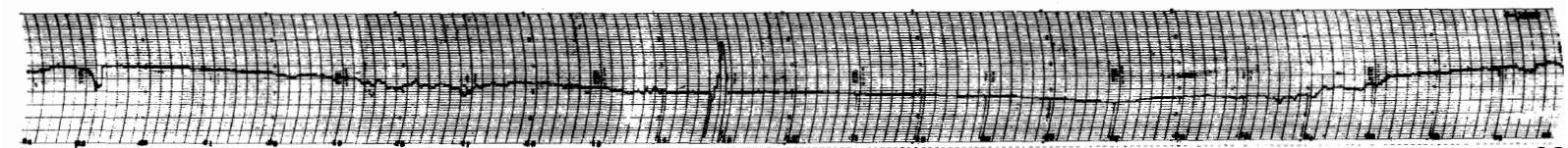
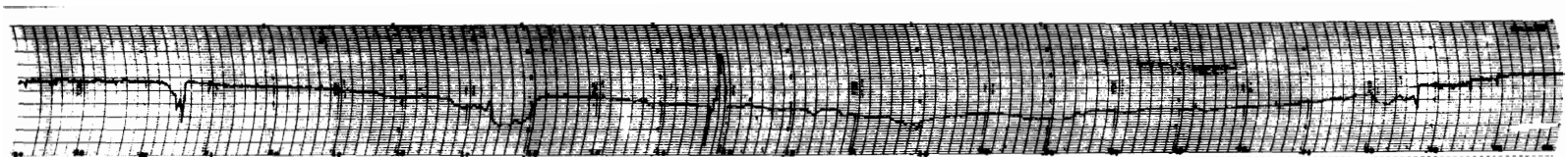
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JUNE 1971

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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

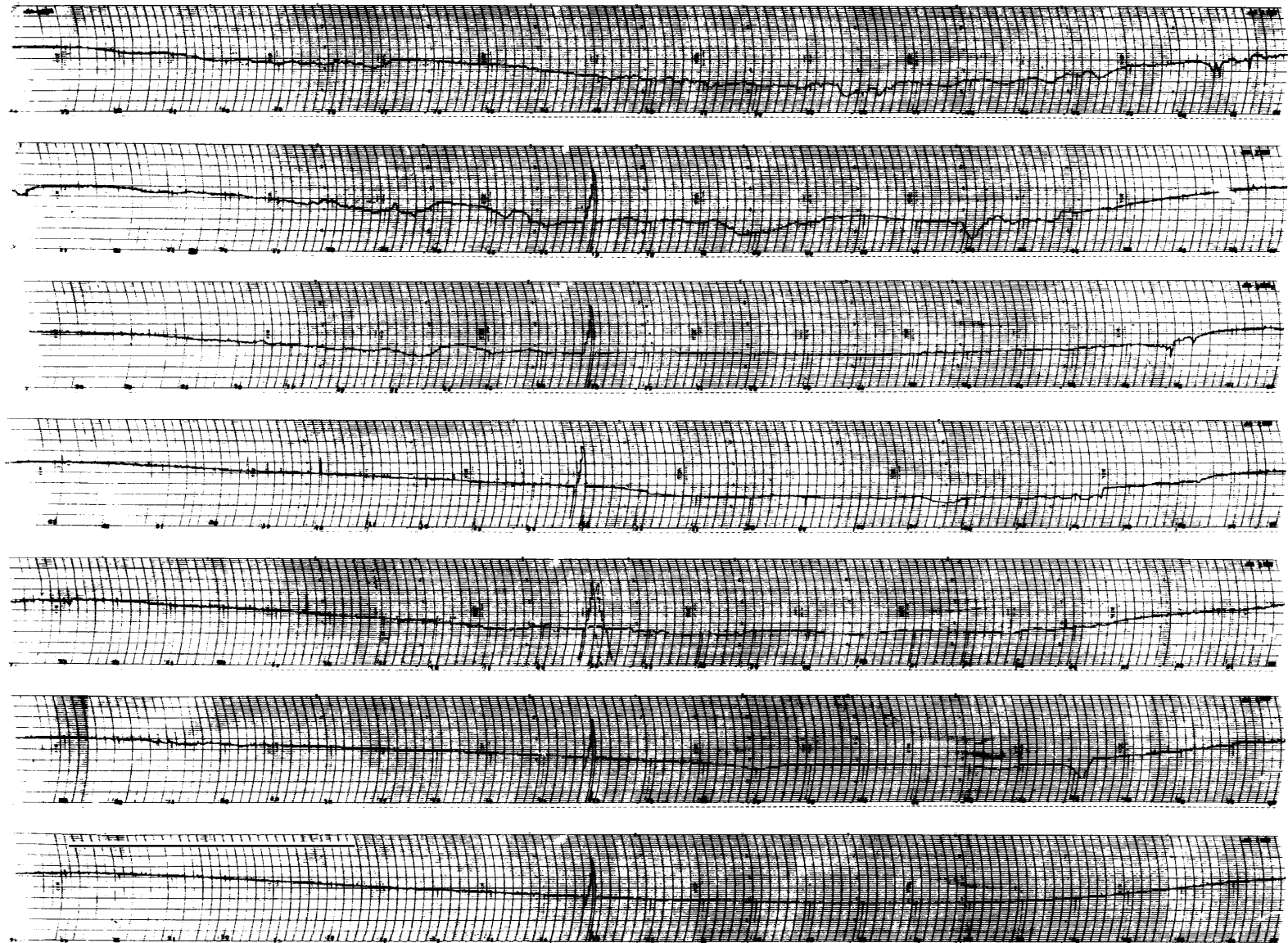
30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

- 1. 0835-0945 failure of equipment.
- 8. 1420-1430 equipment test.
- 25. 0525-0555 failure of equipment.
- 1005-1435 "

JULY 1971

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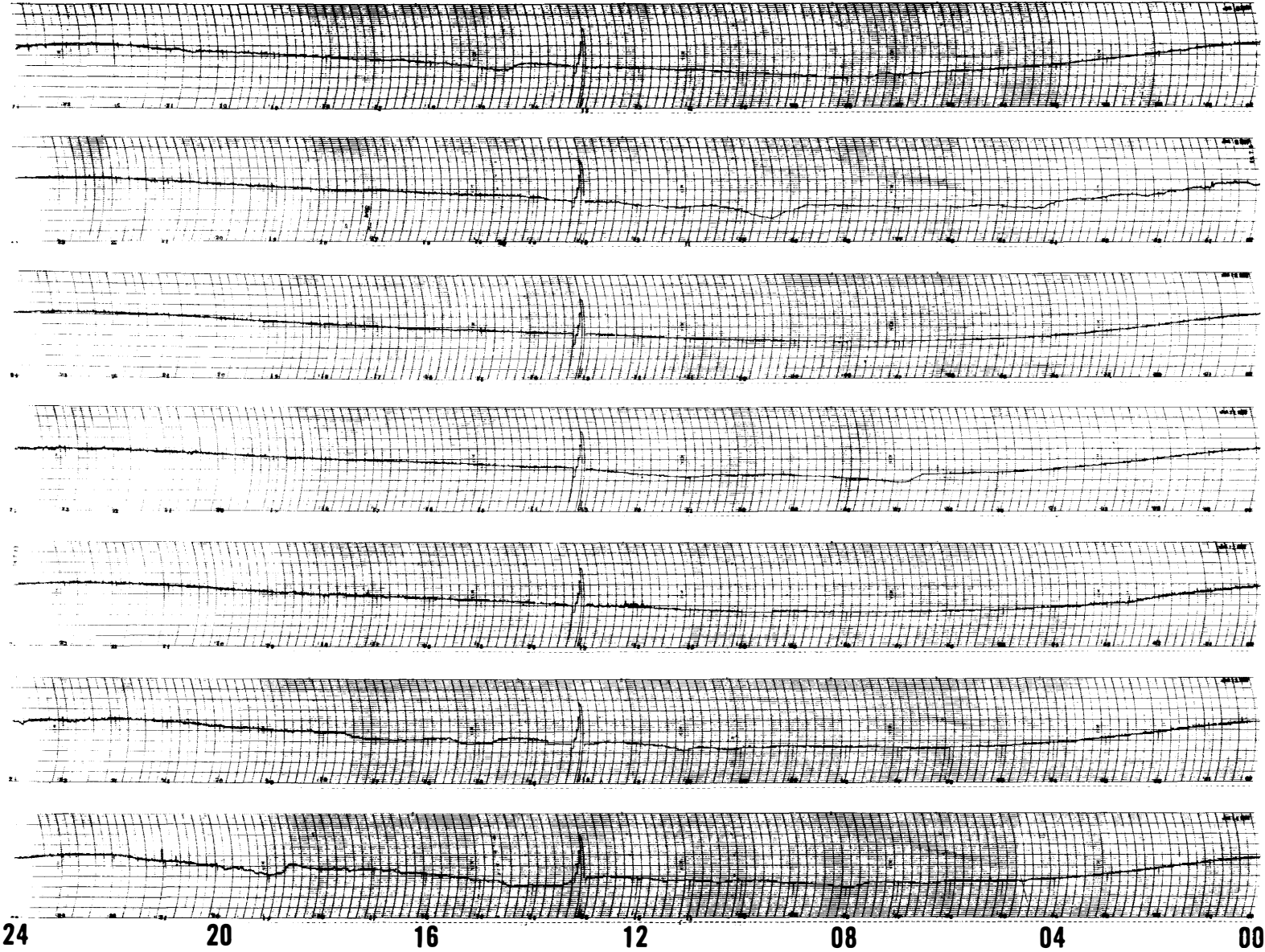
24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JULY 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JULY 1971

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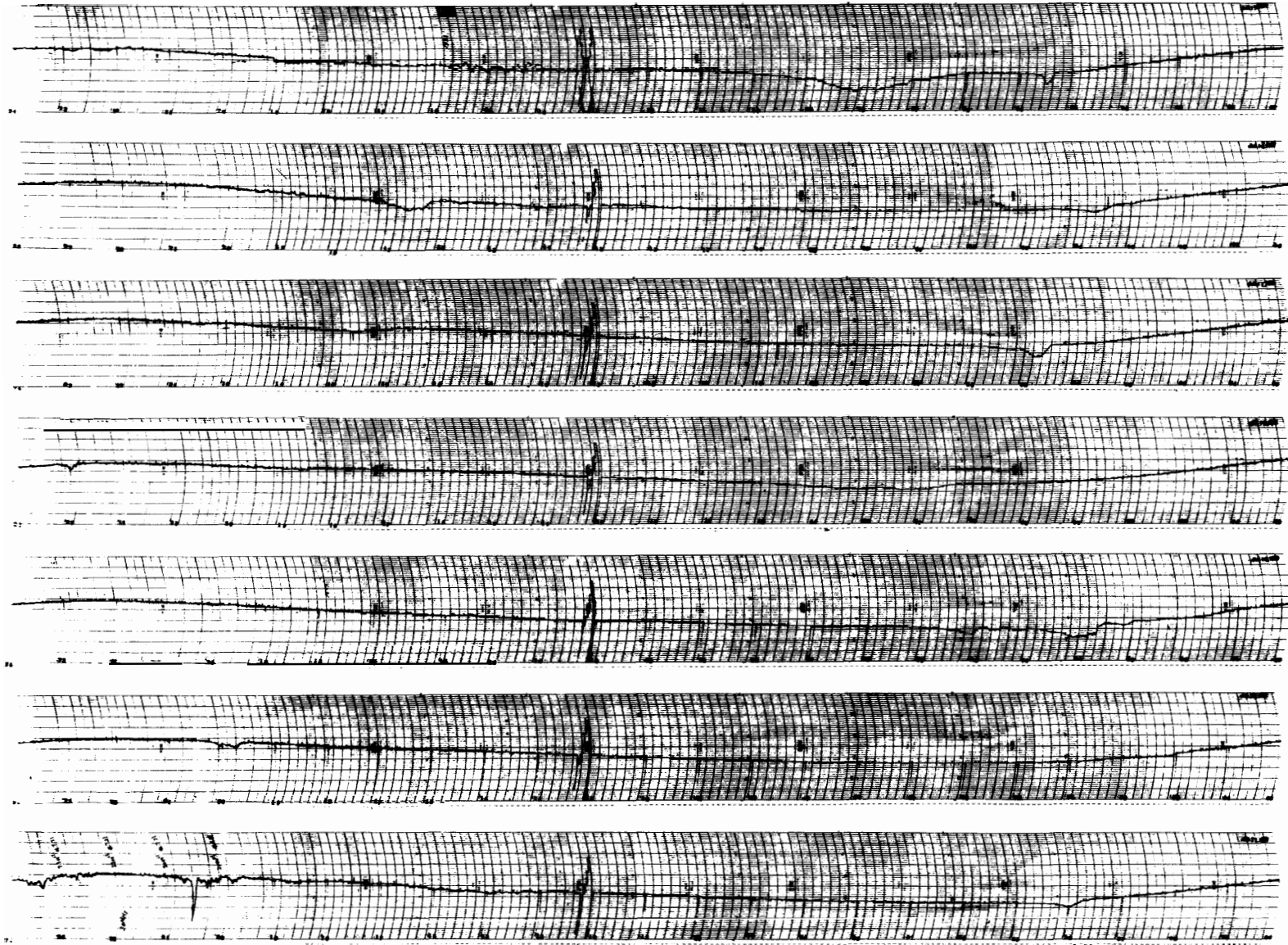
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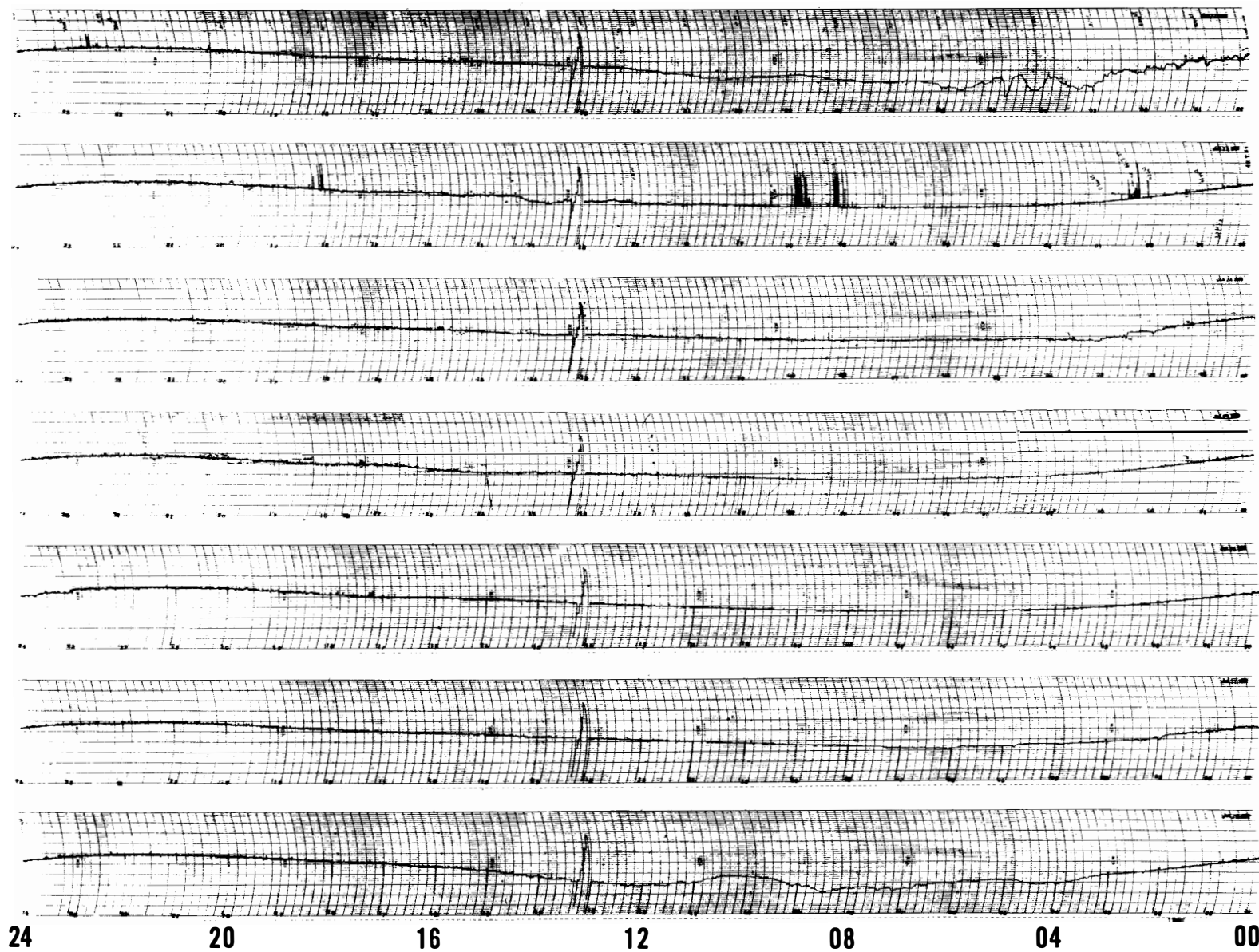


24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JULY 1971



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45° EAST MERIDIAN TIME IN HOURS

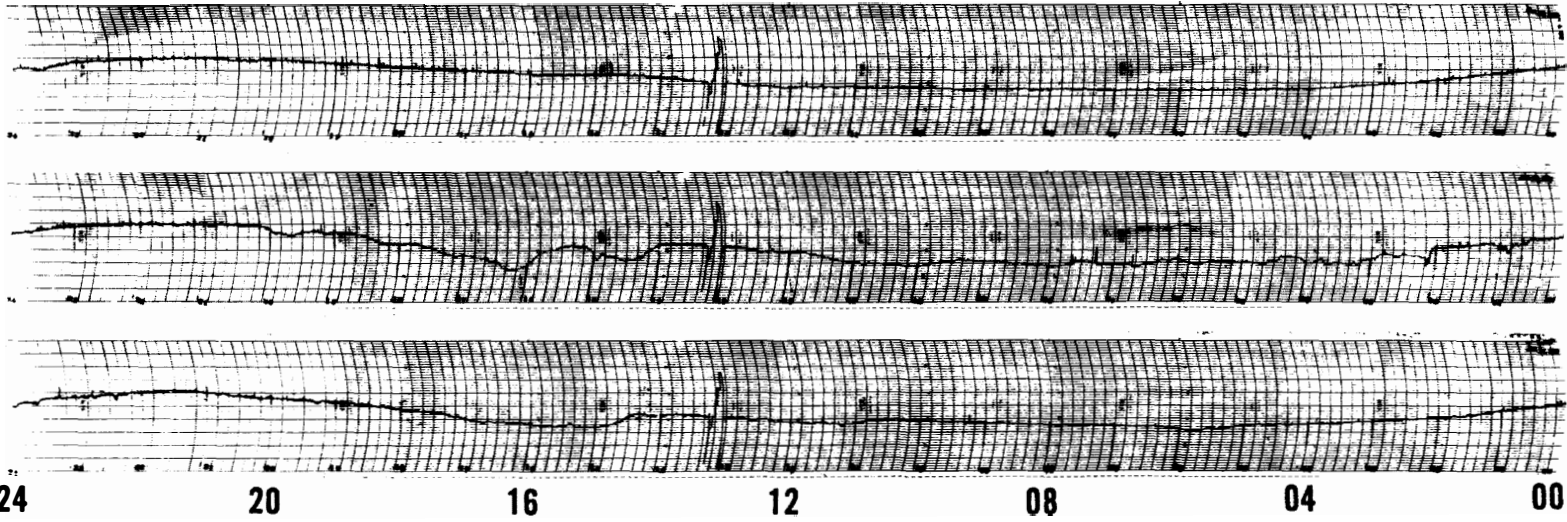
30MHz COSMIC NOISE

JULY 1971

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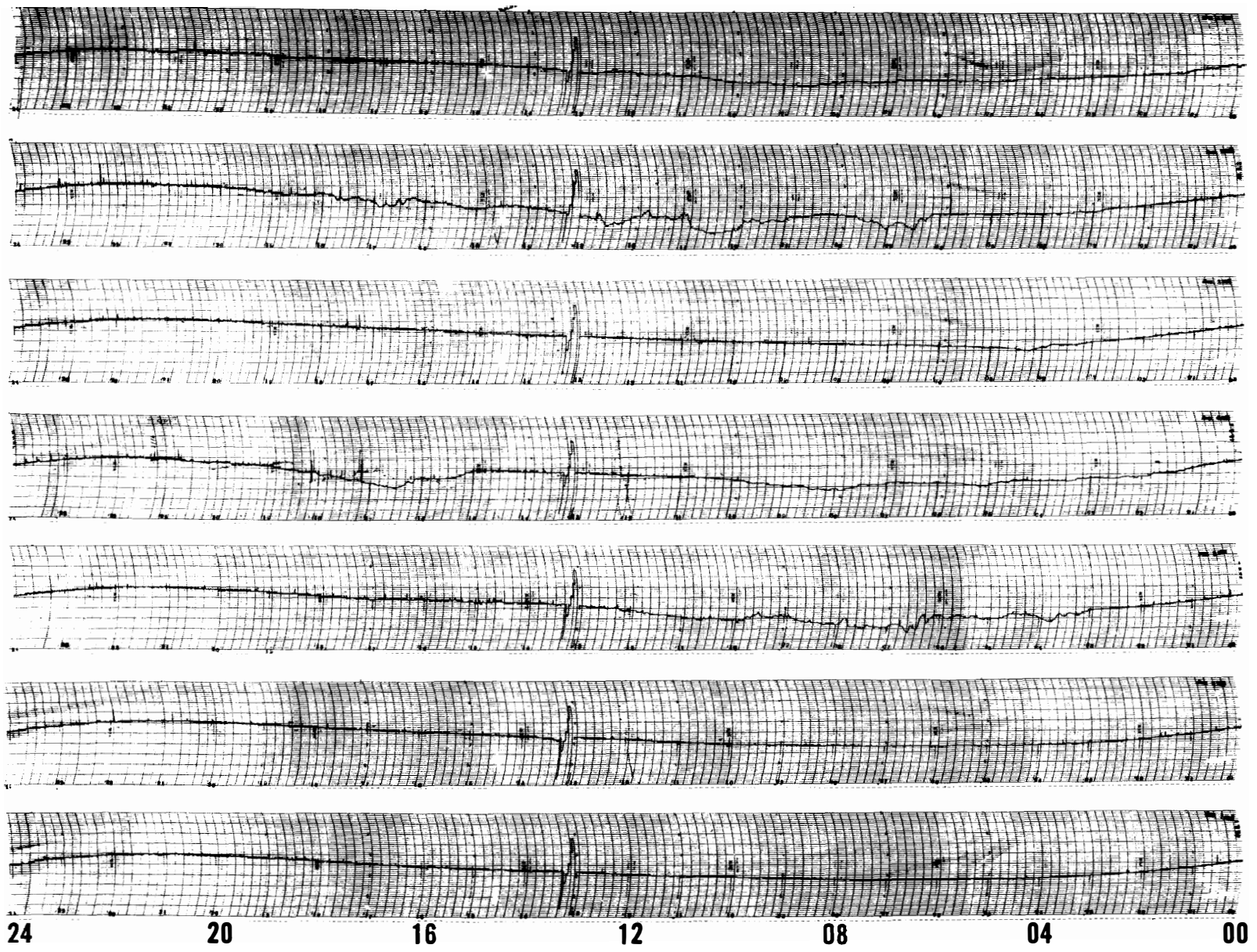


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

AUG 1971

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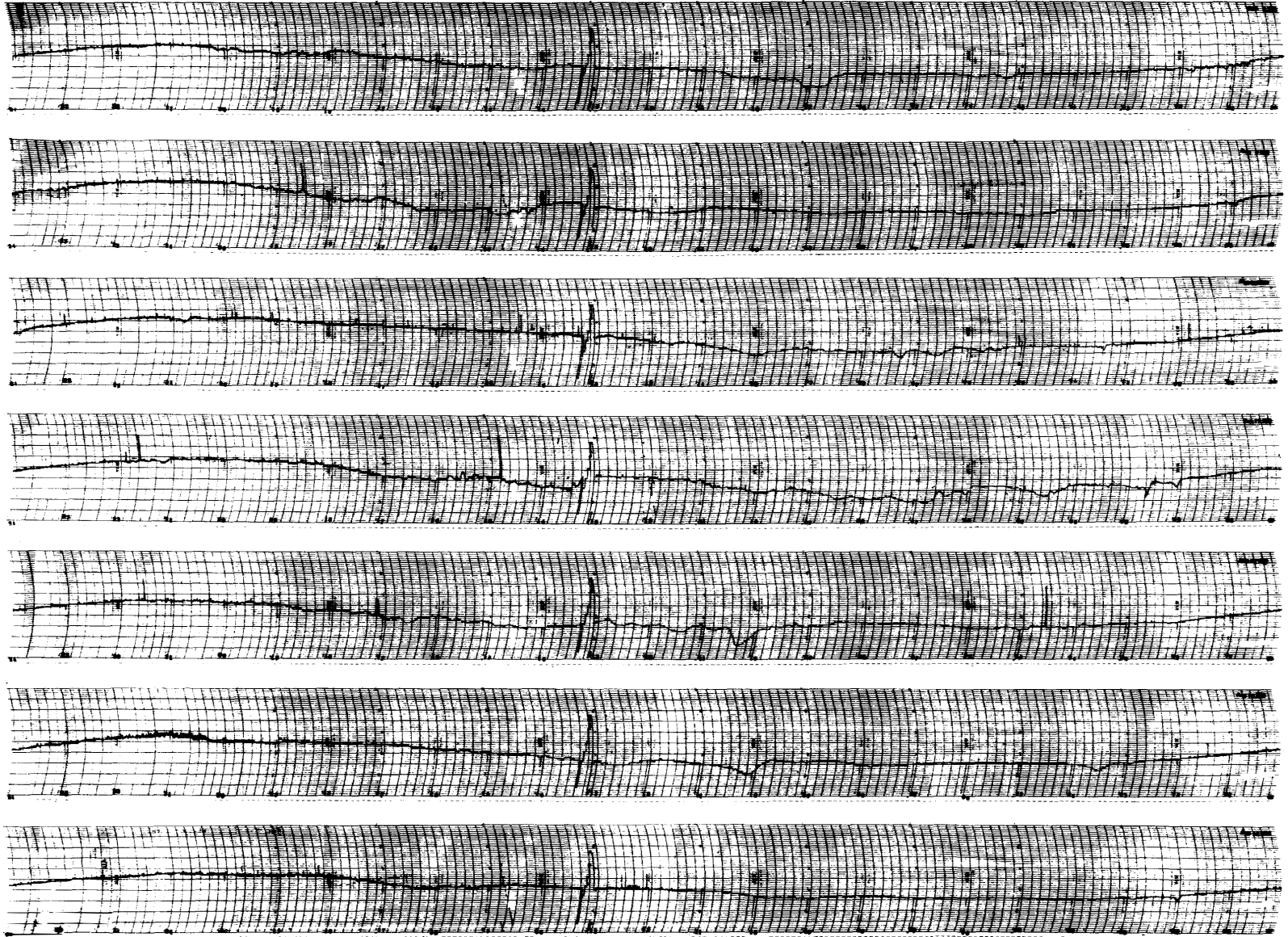


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

AUG 1971

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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

AUG 1971

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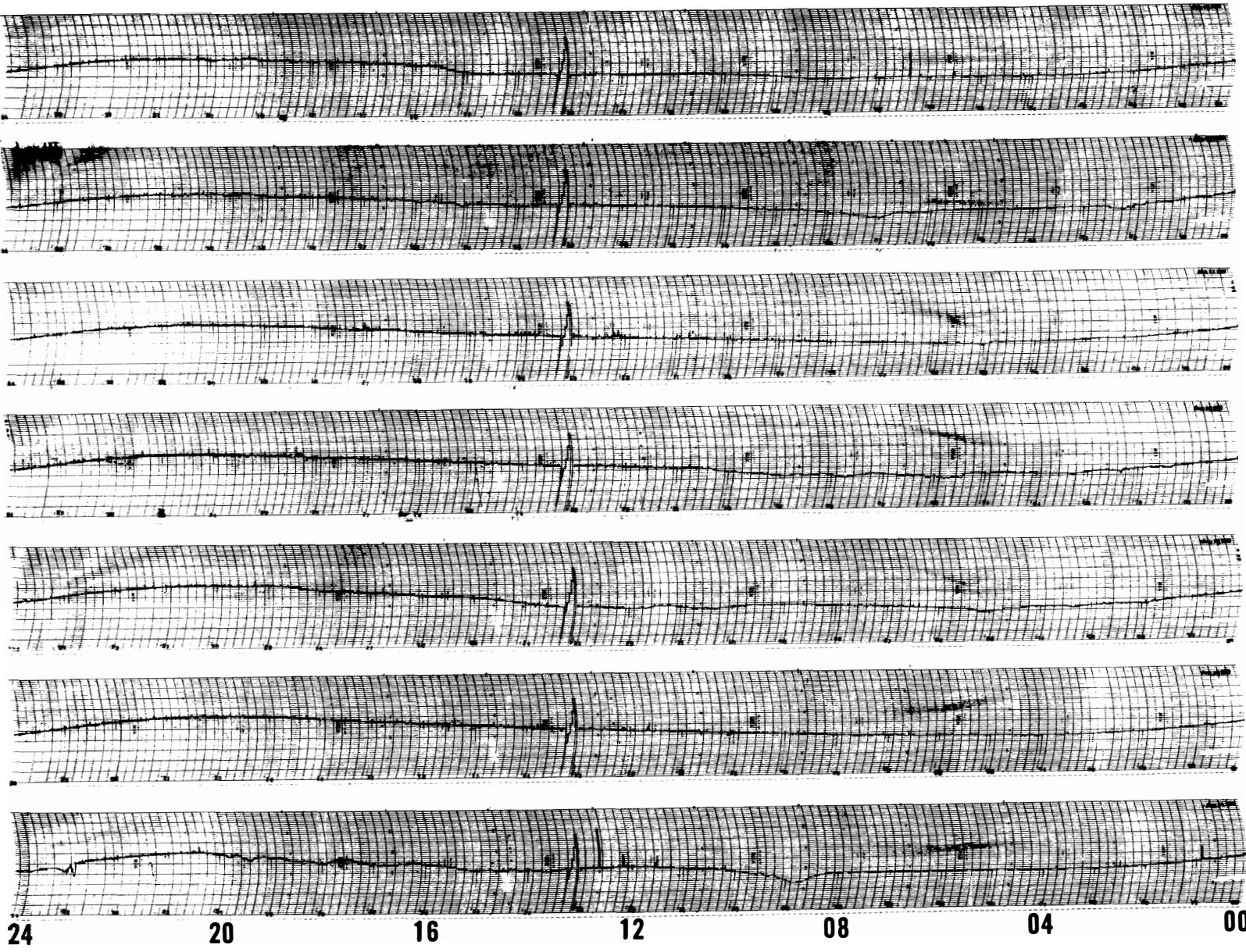
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

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AUG 1971

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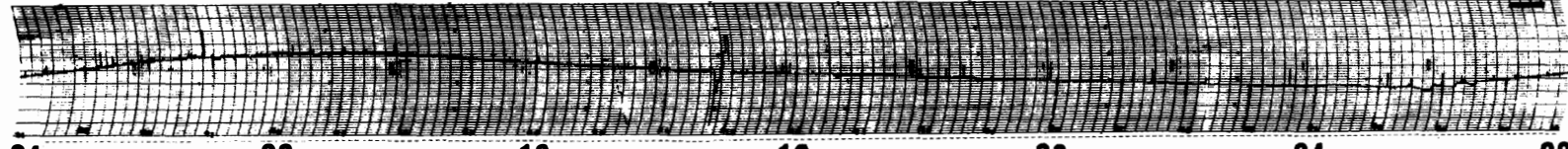
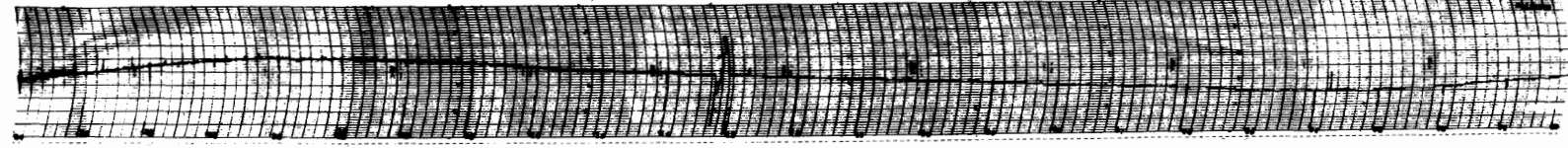
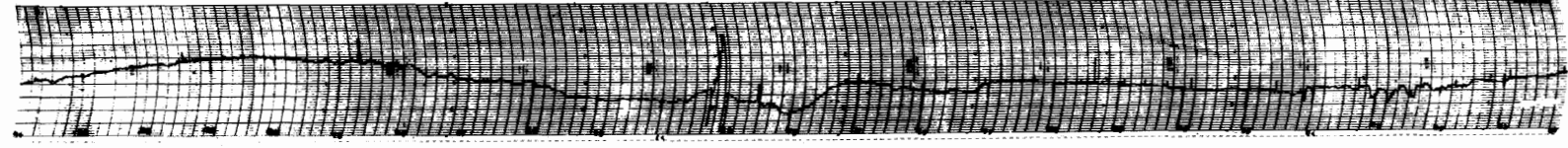
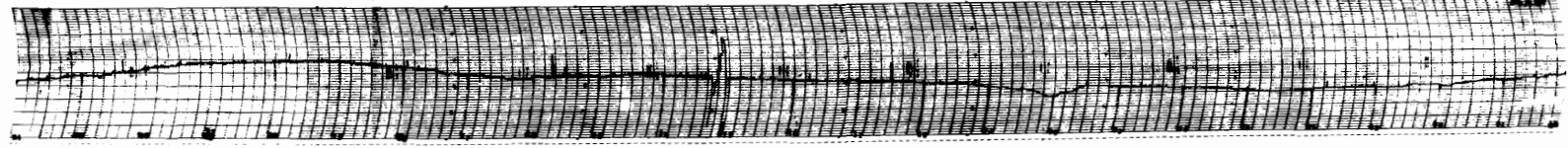
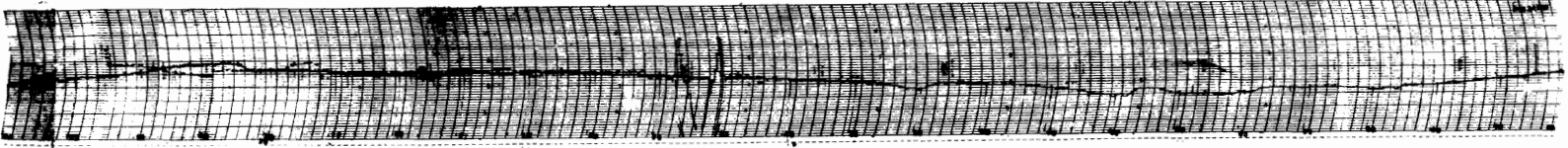
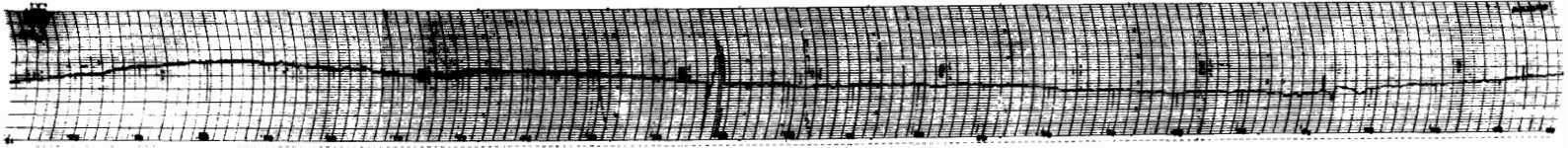
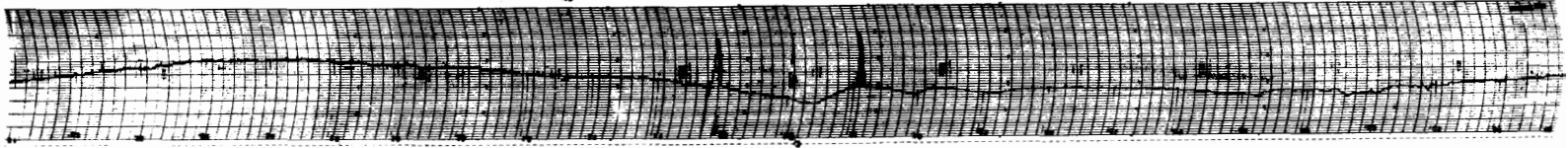
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

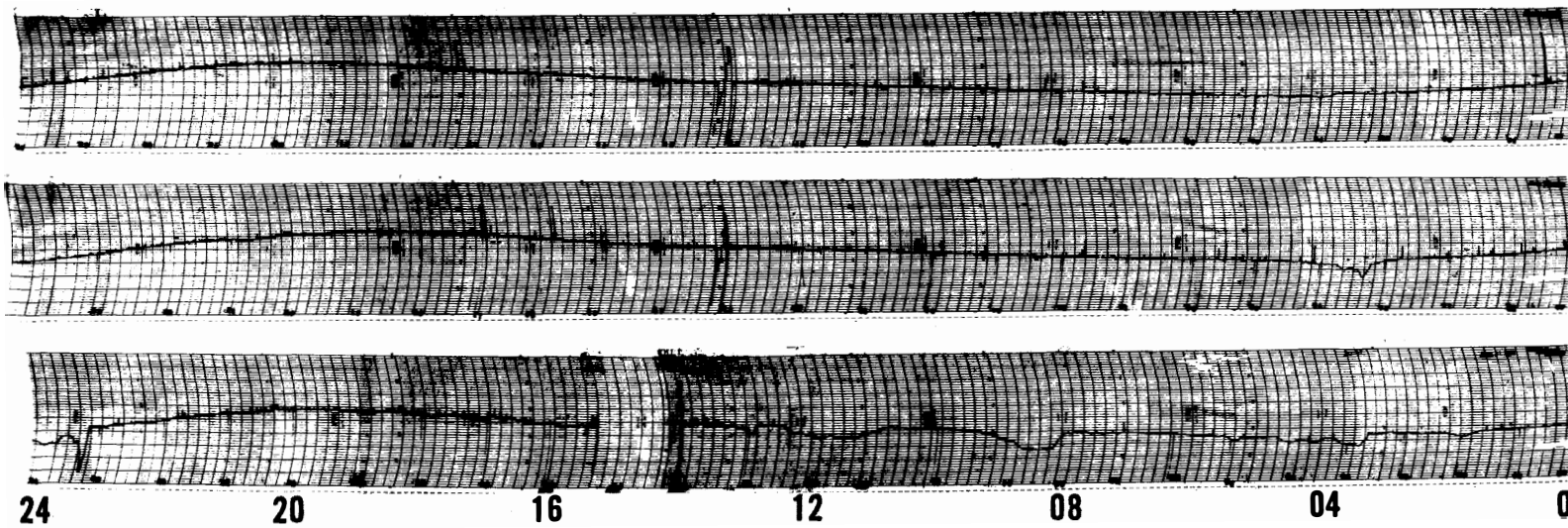
30MHz COSMIC NOISE

AUG 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

31. 1410-1520 failure of equipment.

SEPT 1971

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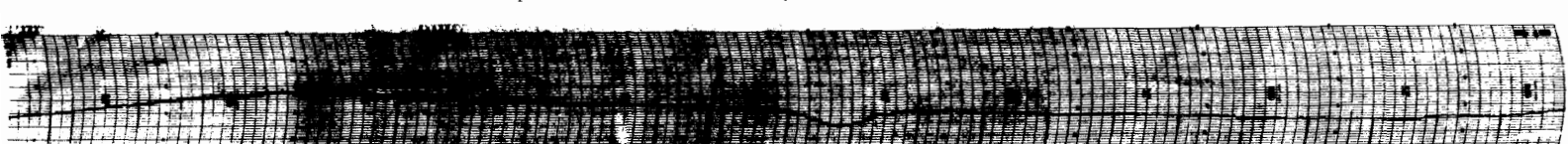
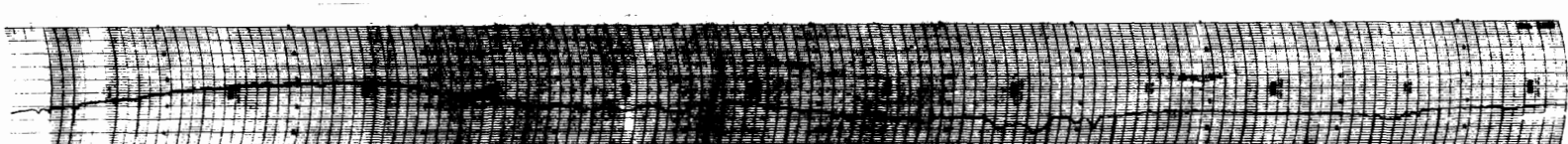
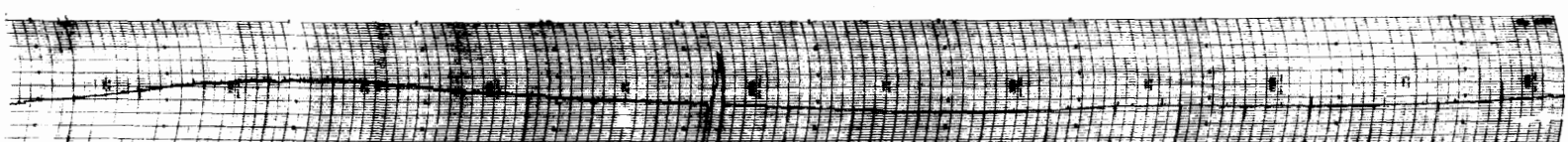
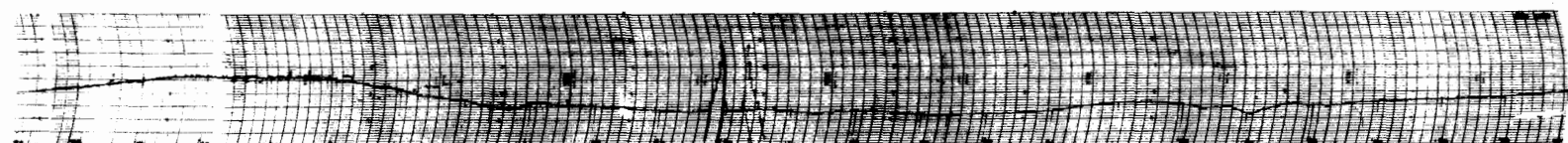
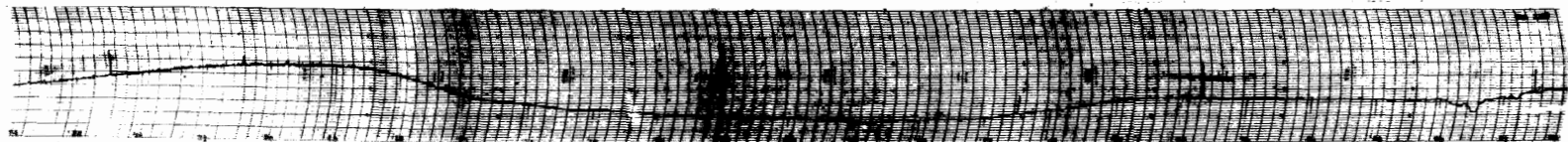
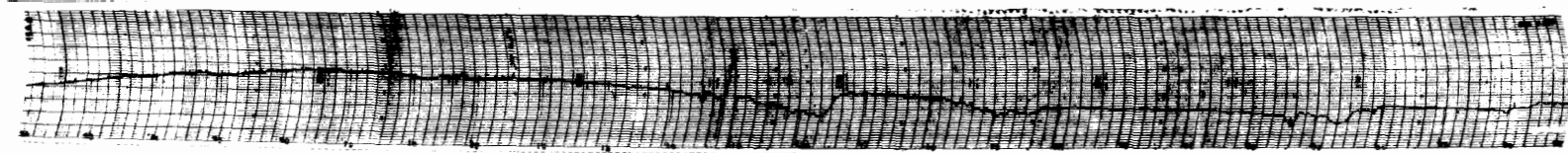
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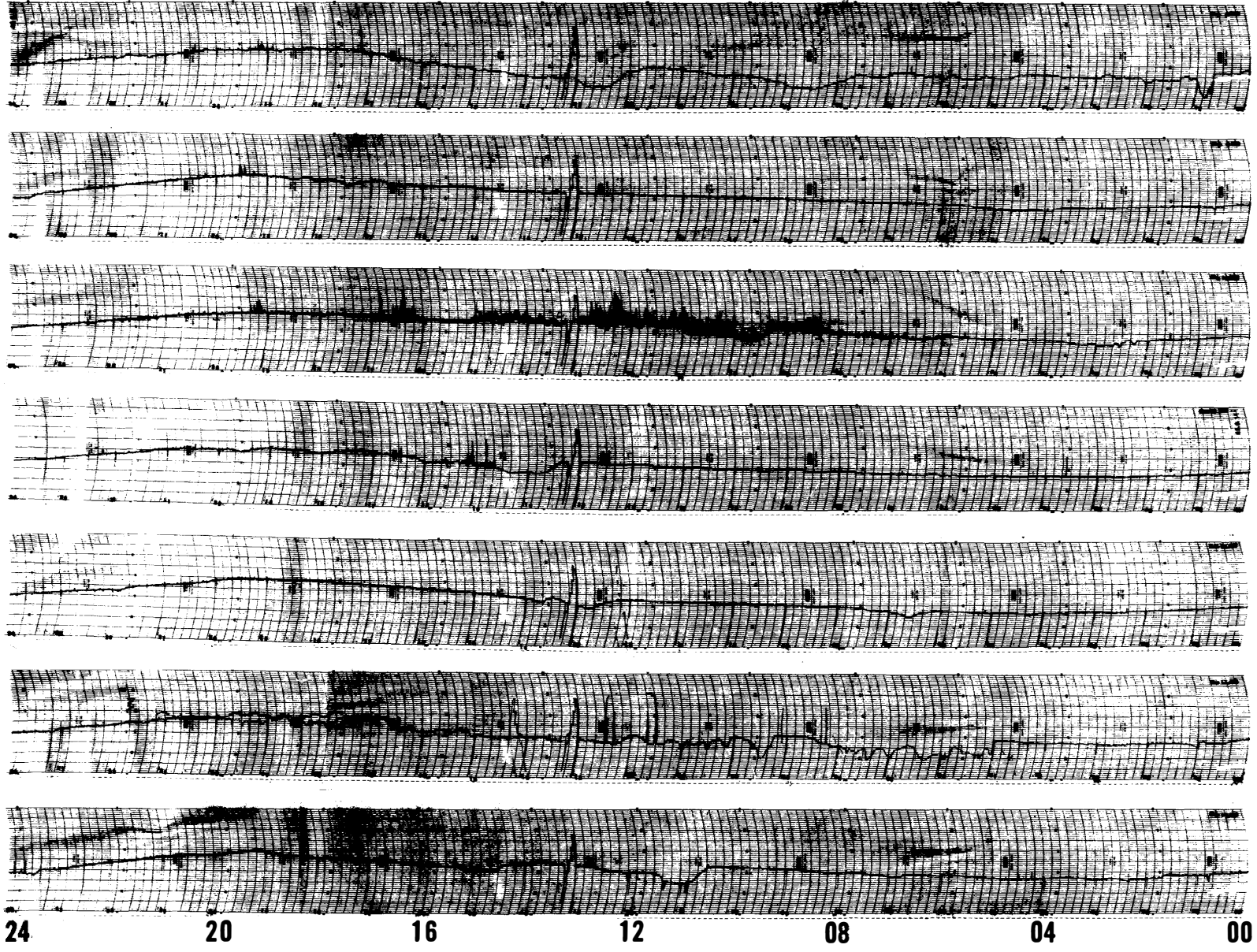
24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

SEPT 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

SEPT 1971

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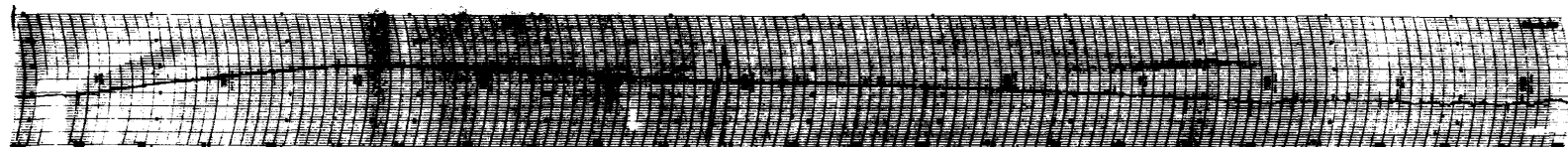
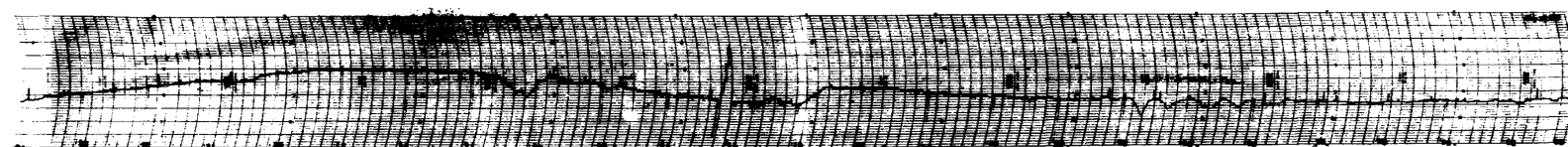
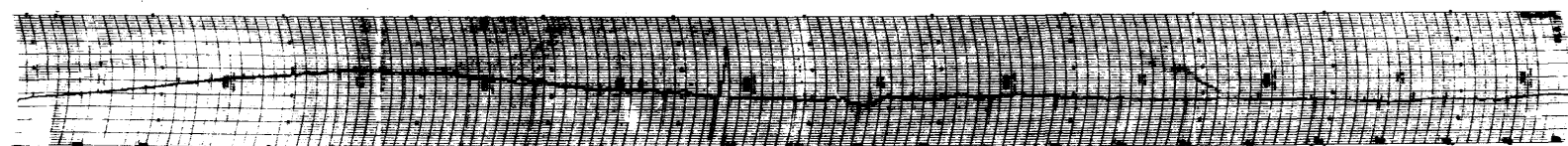
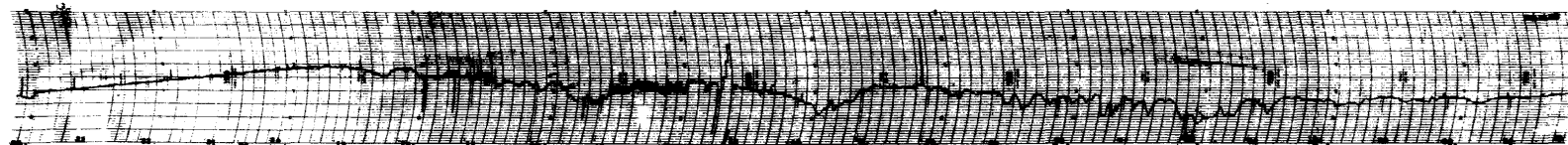
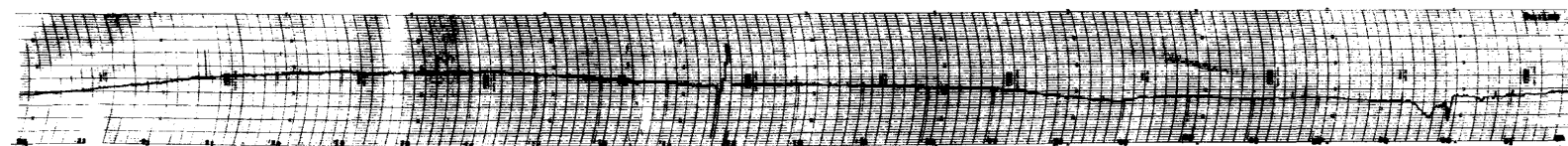
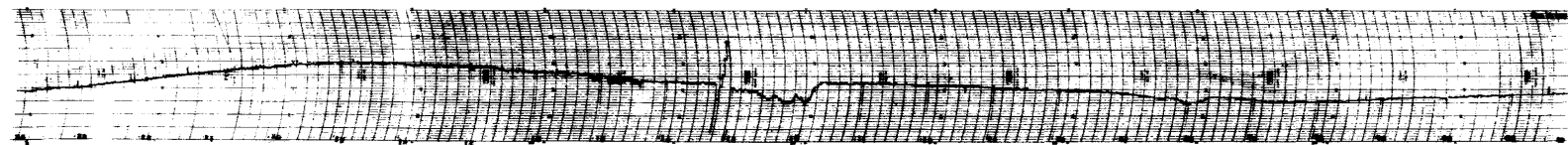
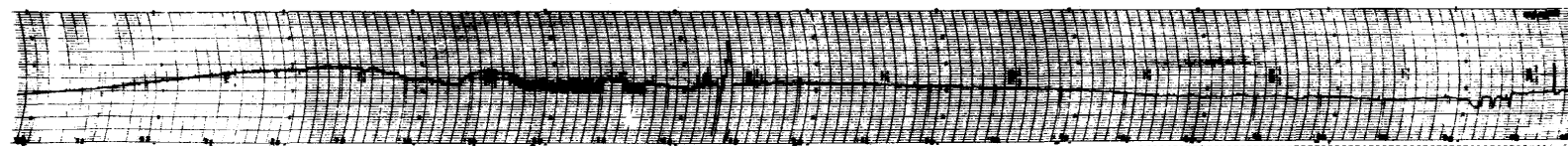
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

SEPT 1971

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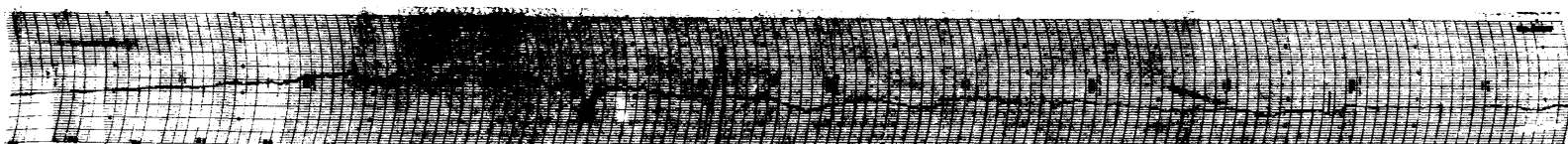
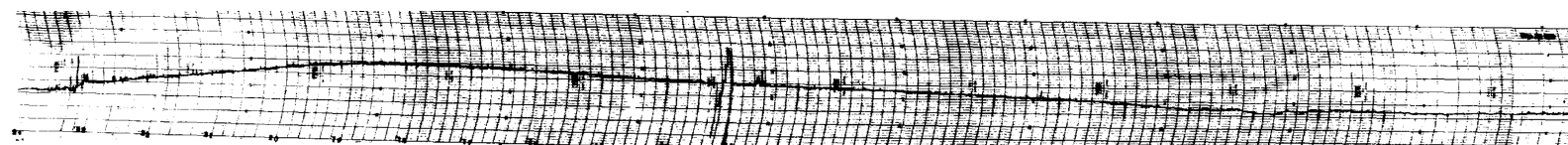
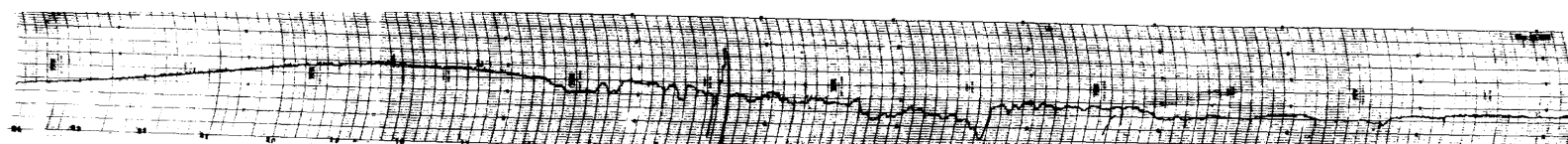
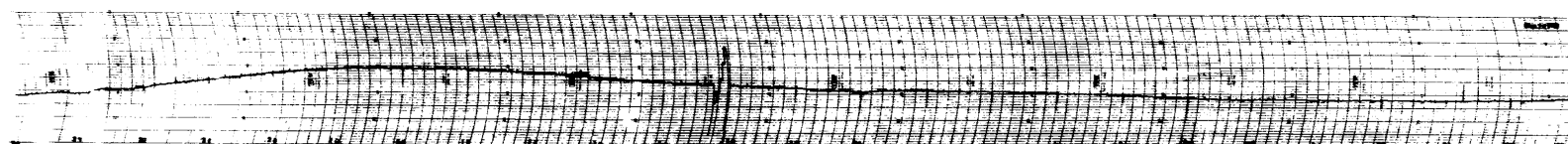
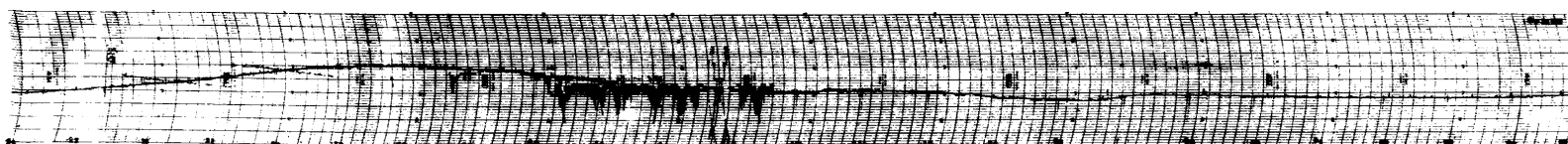
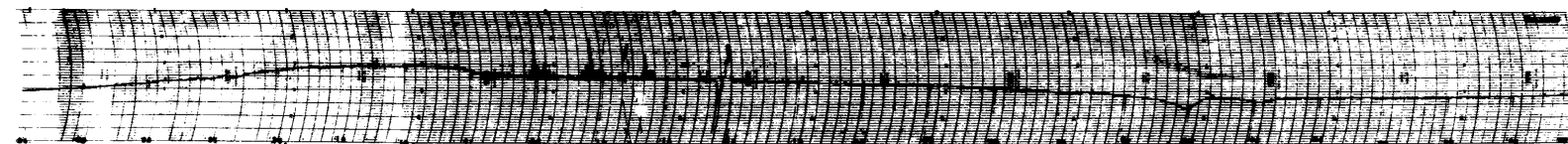
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24 20 16 12 08 04 00

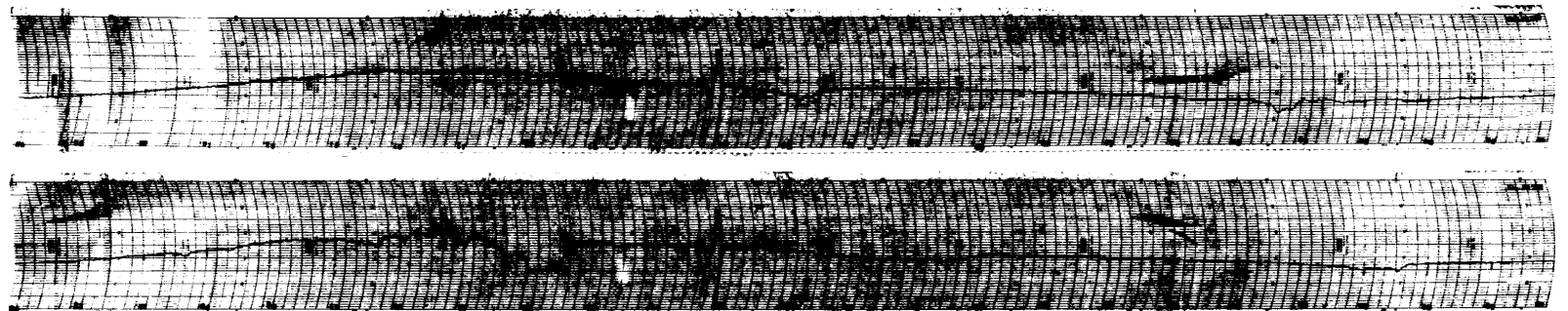
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

29

SEPT 1971

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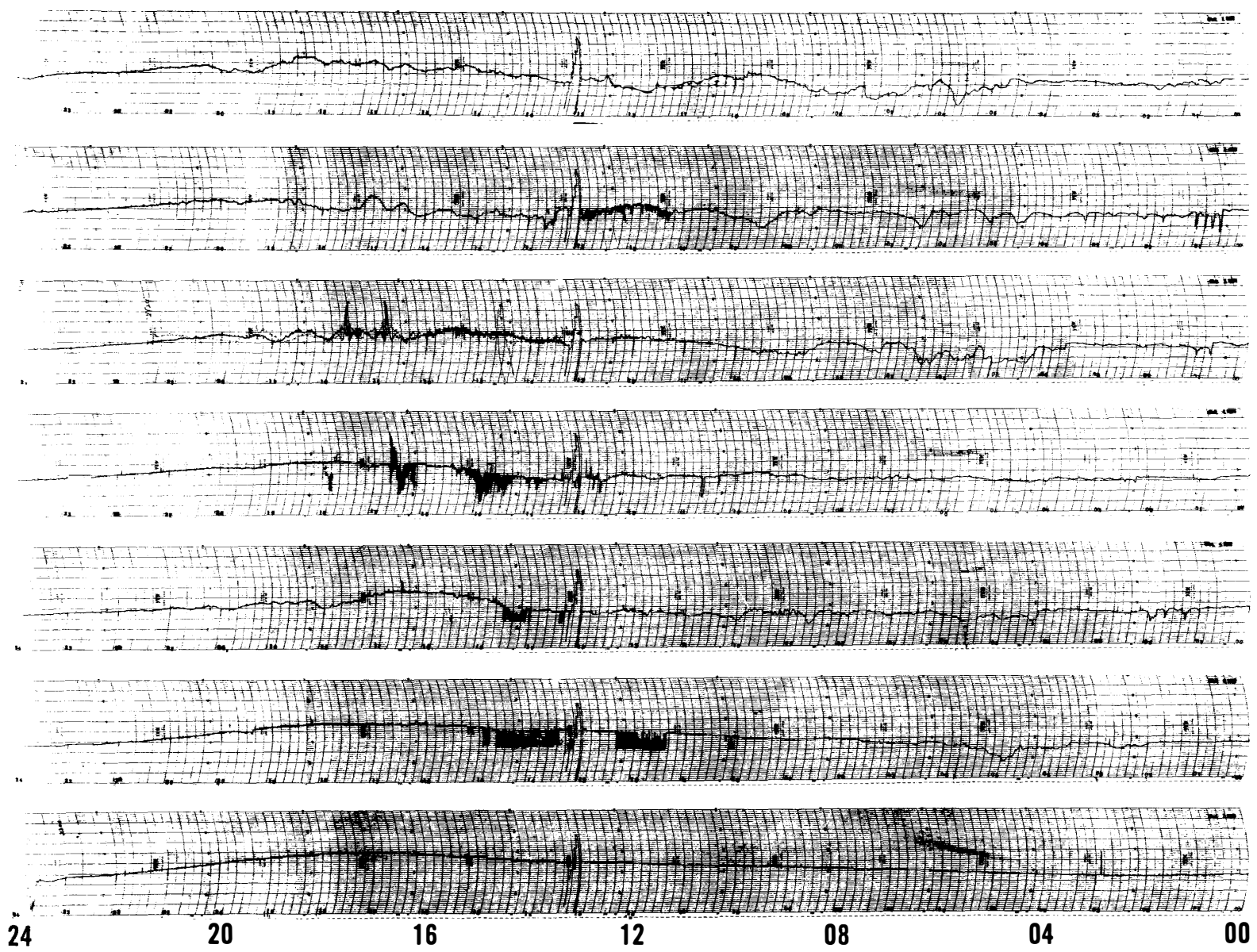
24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

OCT 1971

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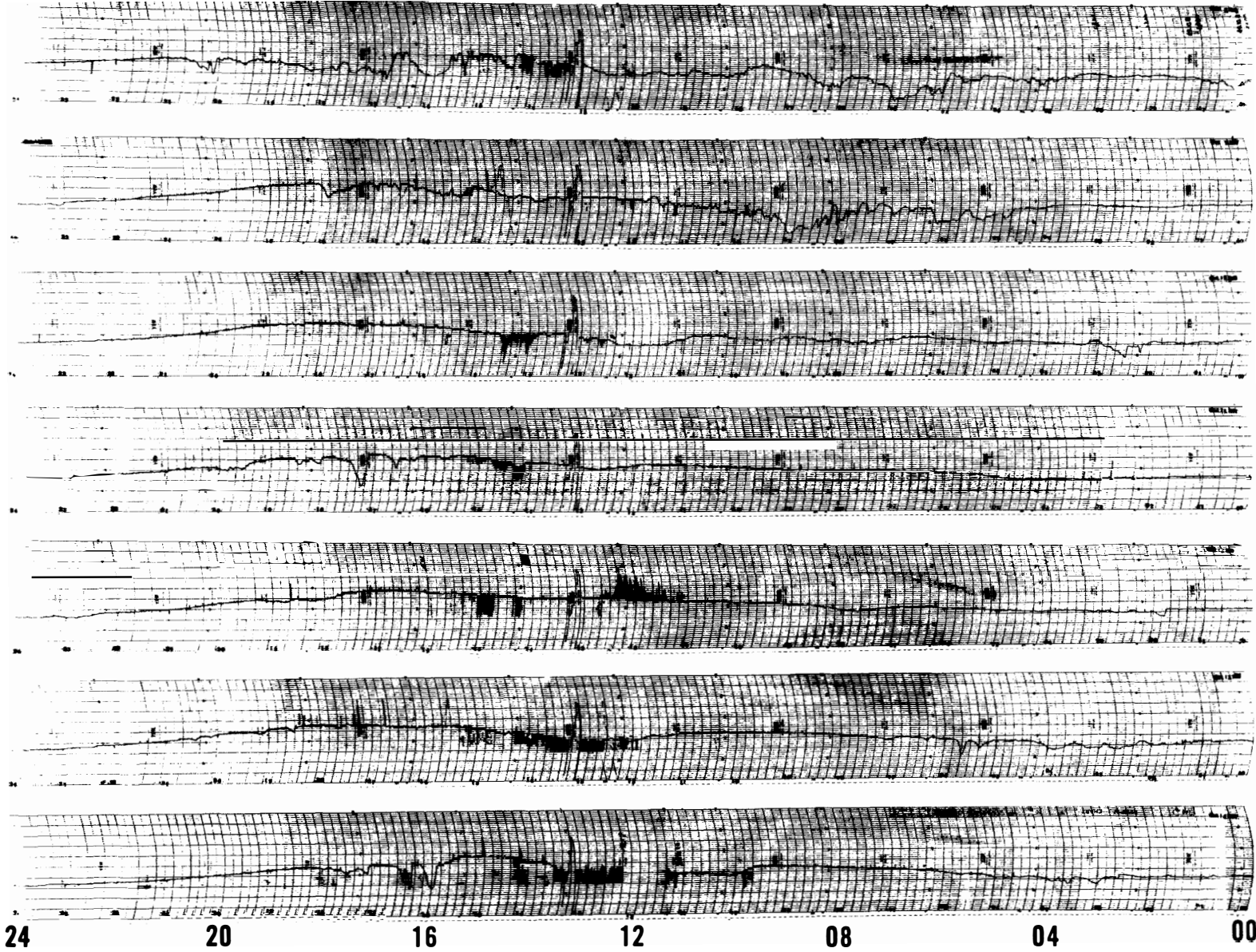


45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

OCT 1971

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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

OCT 1971

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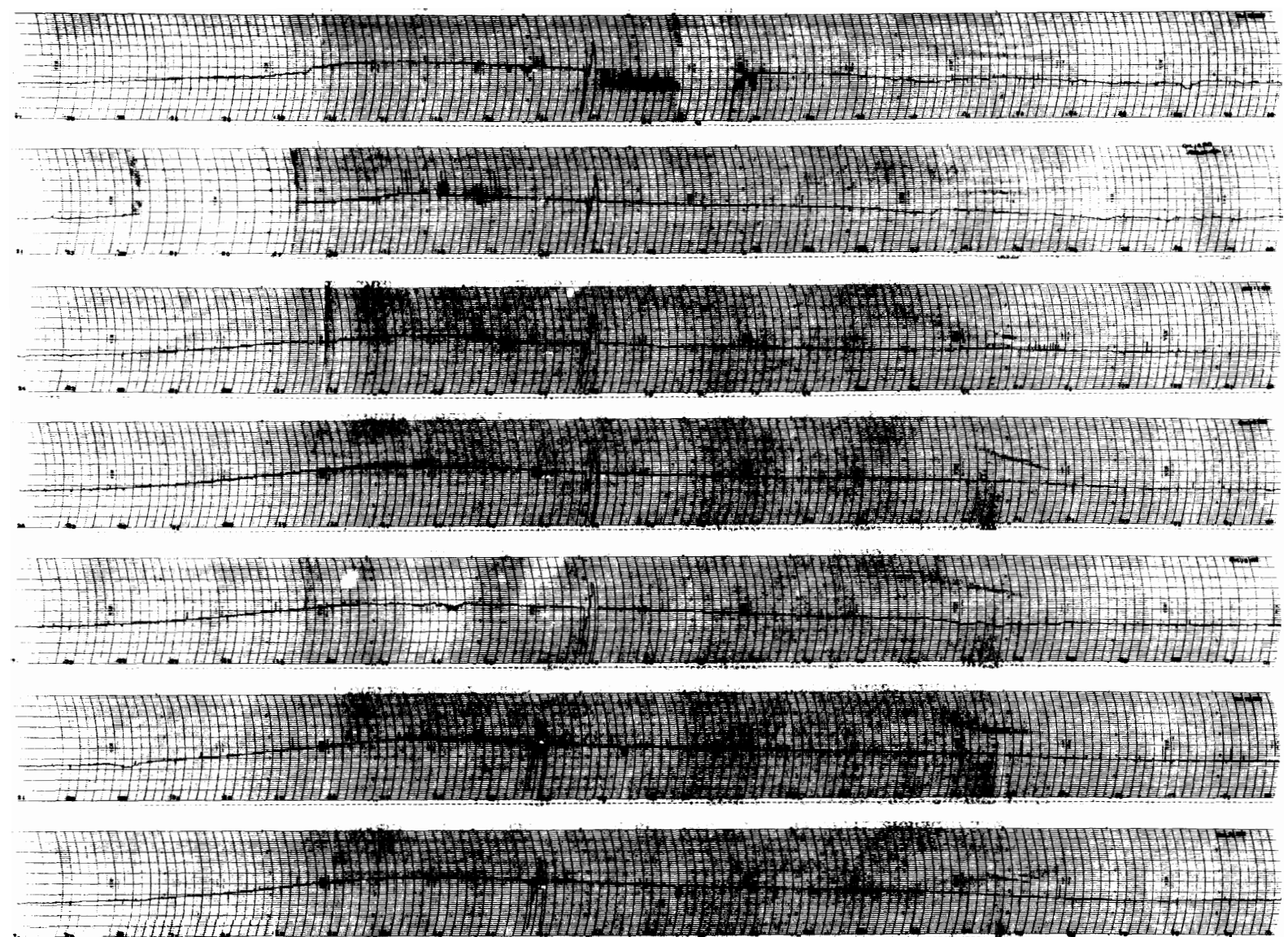
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

OCT 1971

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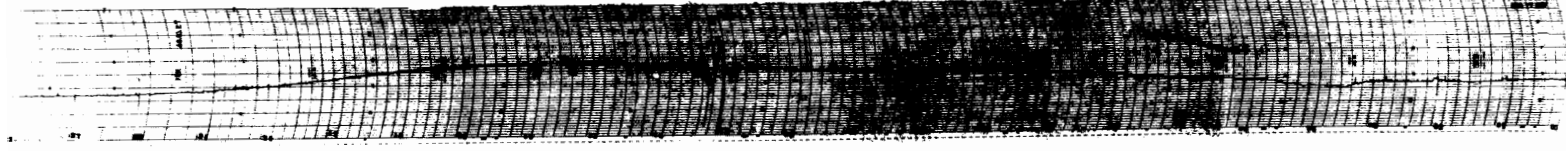
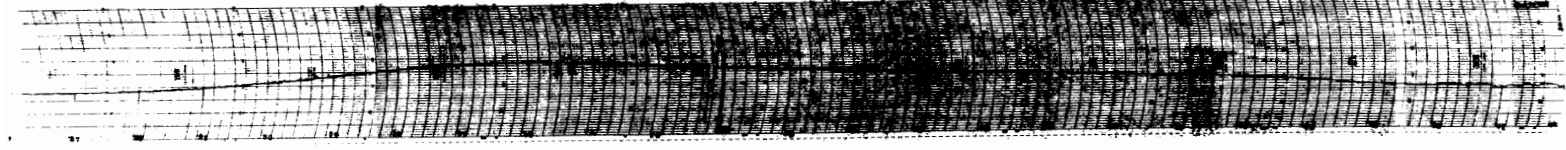
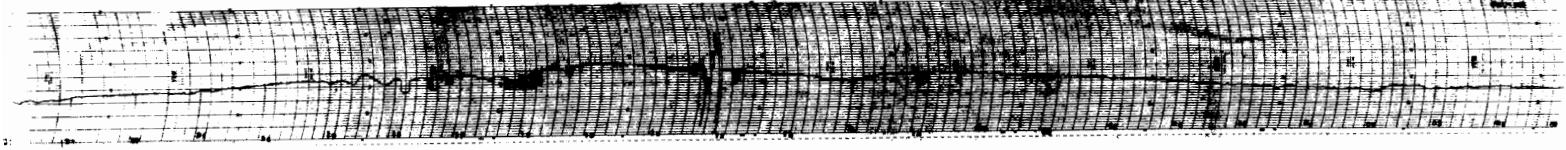
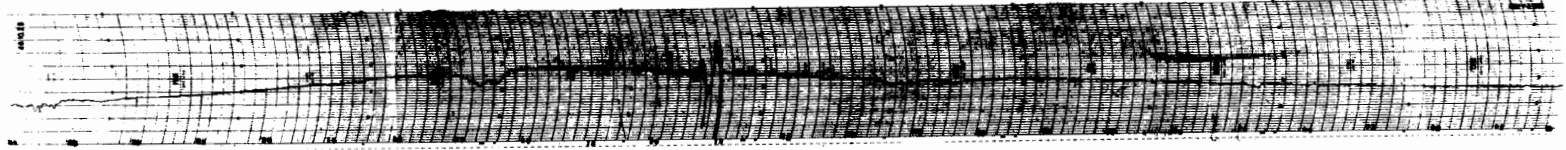
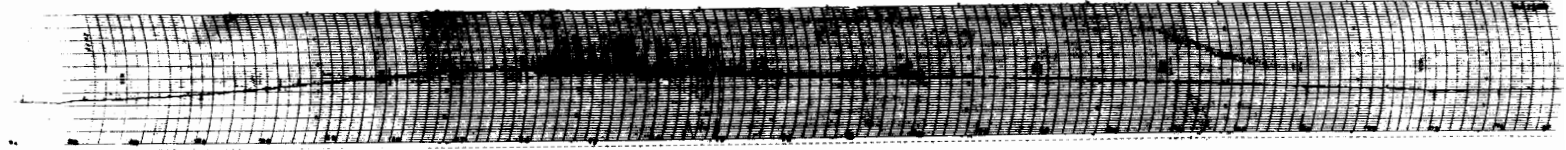
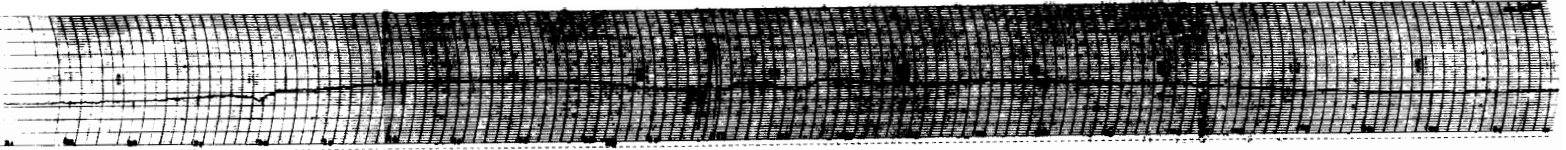
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

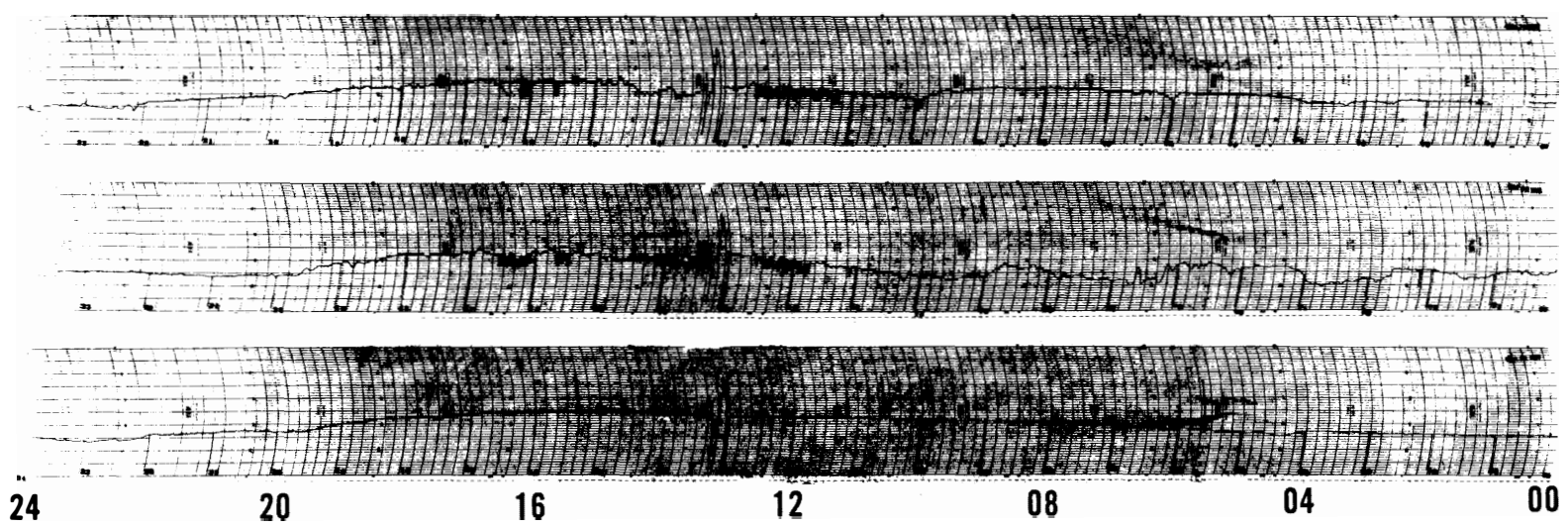
30MHz COSMIC NOISE

OCT 1971

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45° EAST MERIDIAN TIME IN HOURS

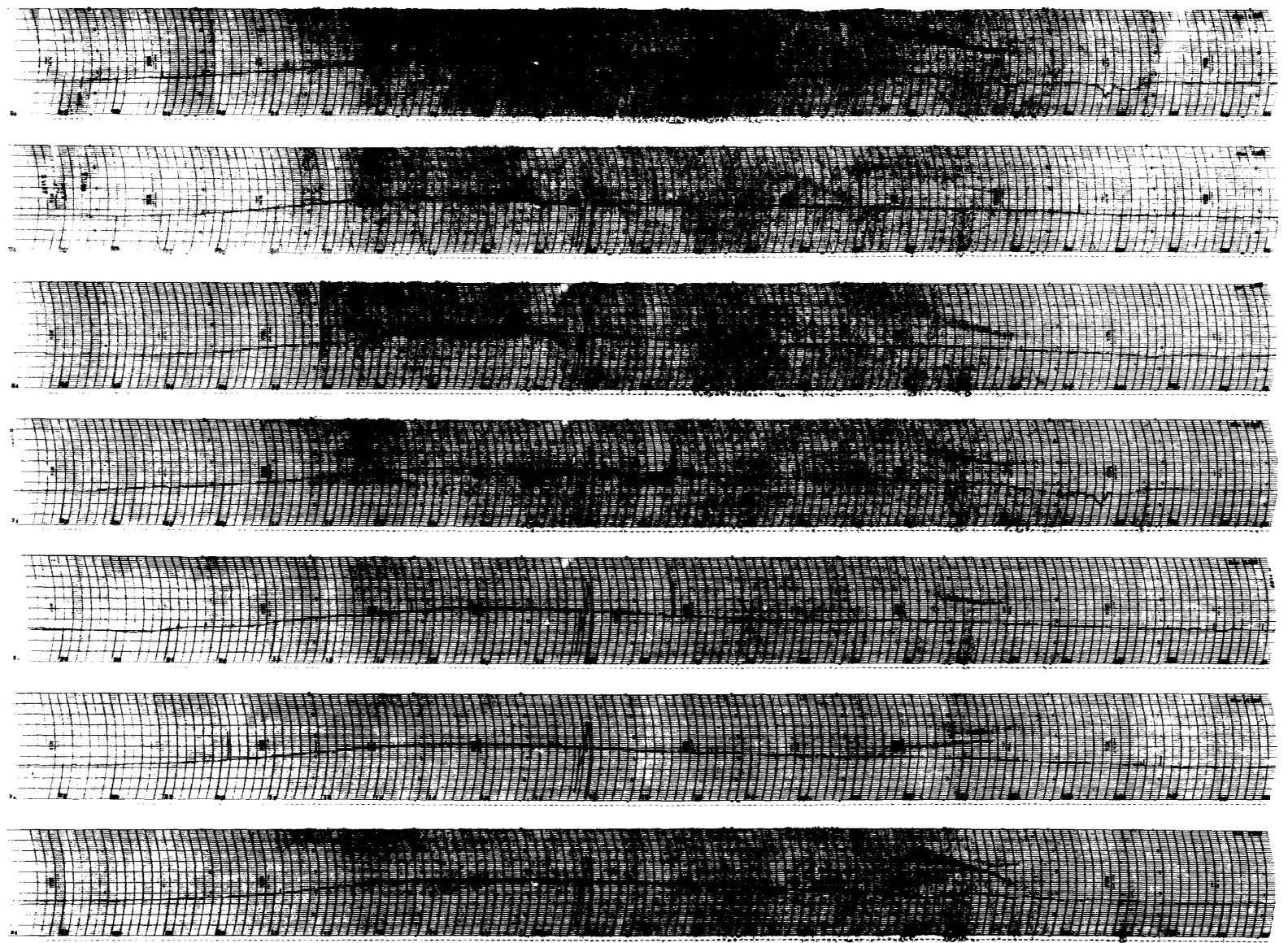
30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

- 14. 1120-1210 failure of equipment.
- 15. 1020-1130 "
- 16. 1840-2140 "
- 28. 1300-2300 "
- 29. 0020-0120 "

NOV 1971

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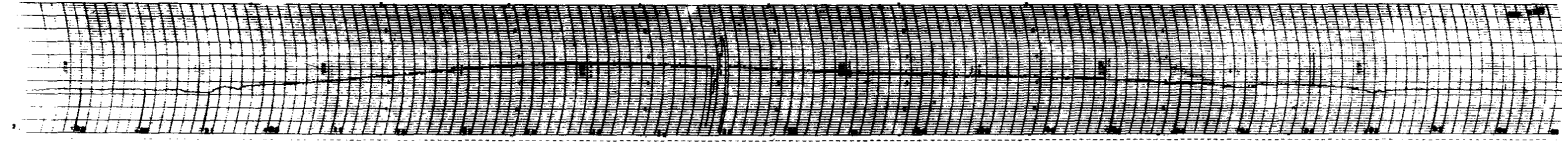


24 20 16 12 08 04 00

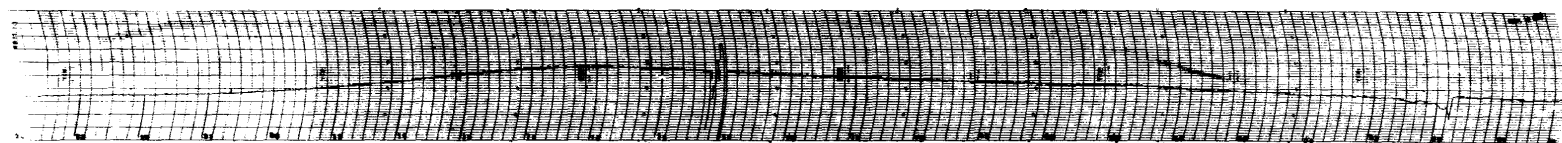
45° EAST MERIDIAN TIME IN HOURS 30MHz COSMIC NOISE

NOV 1971

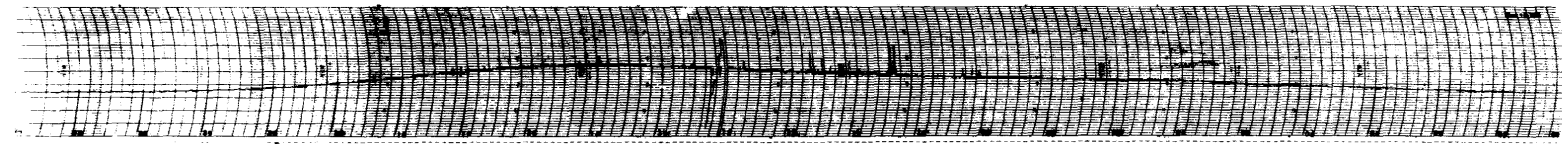
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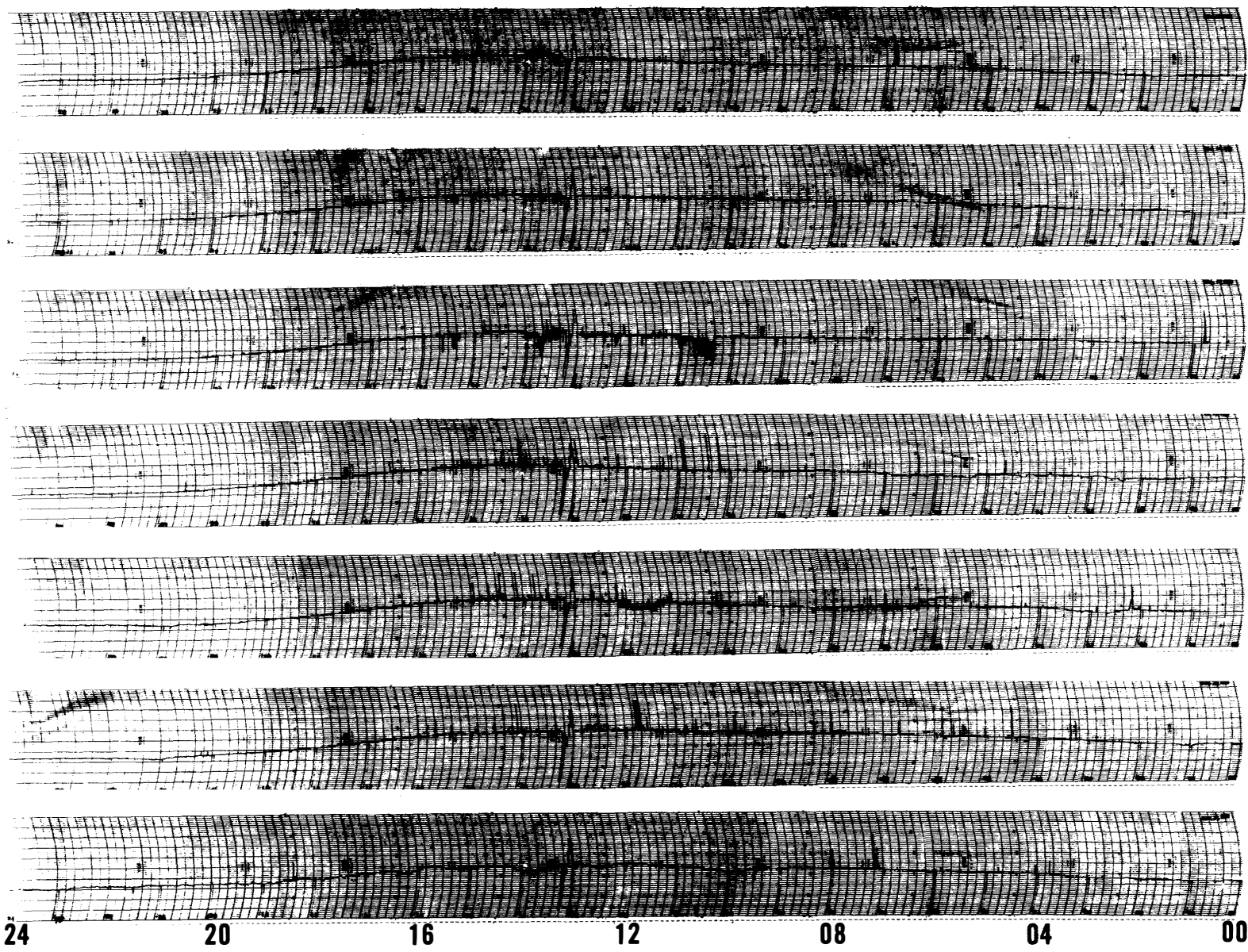
24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

NOV 1971

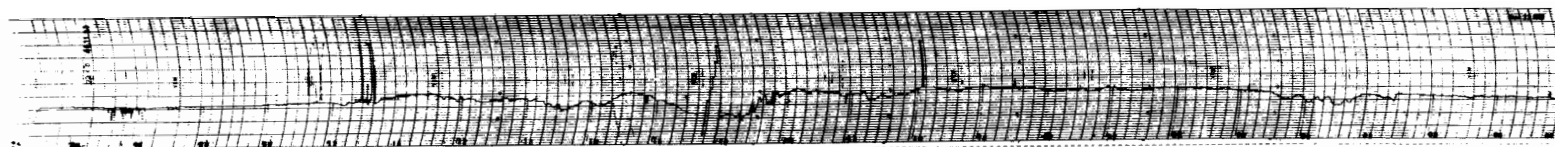
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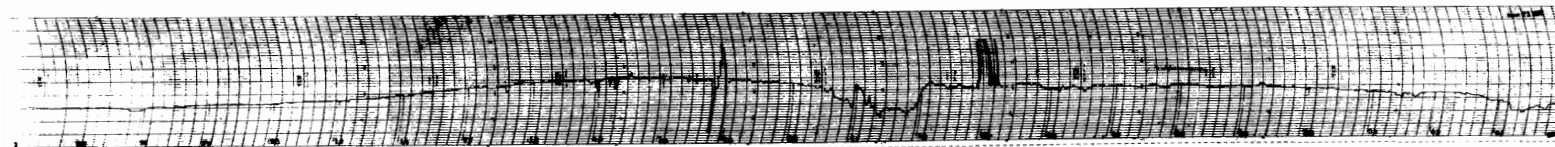
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

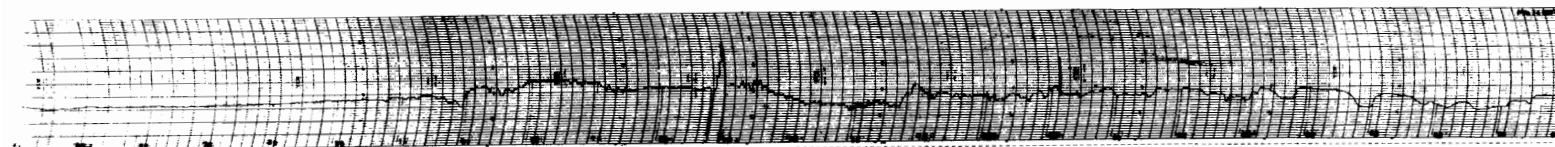
NOV 1971



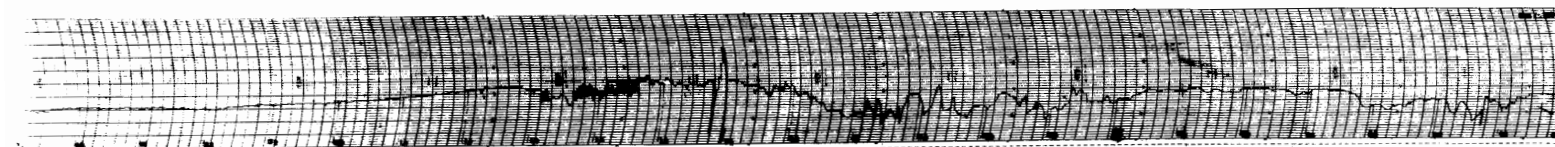
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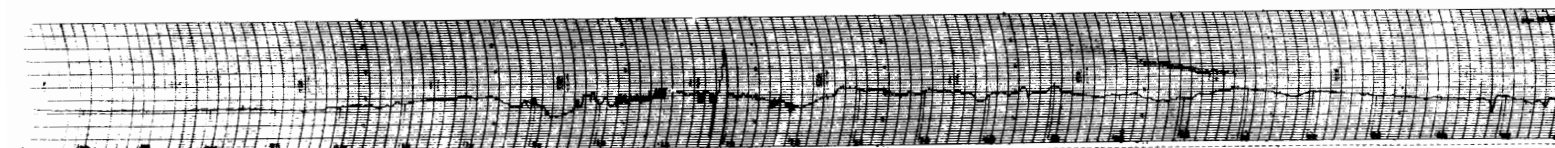
23



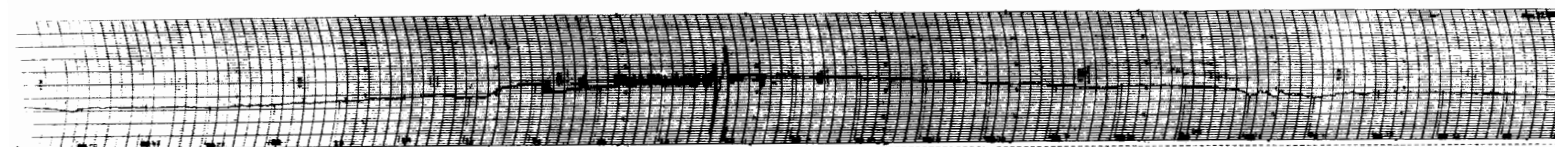
24



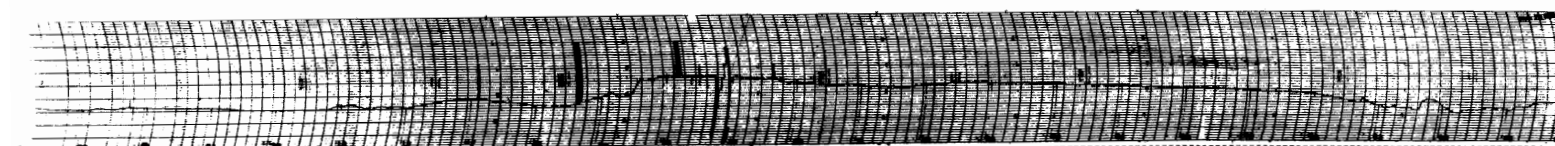
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24 20 16 12 08 04 00

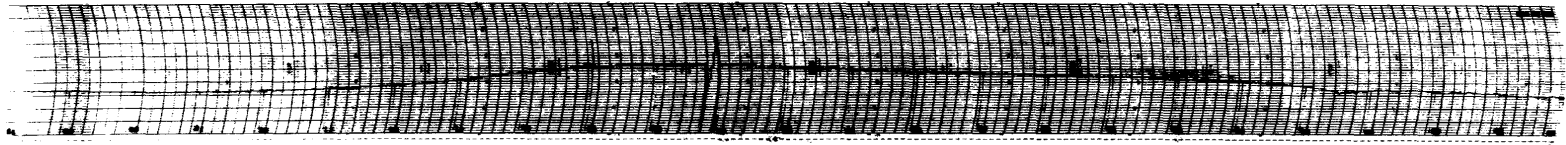
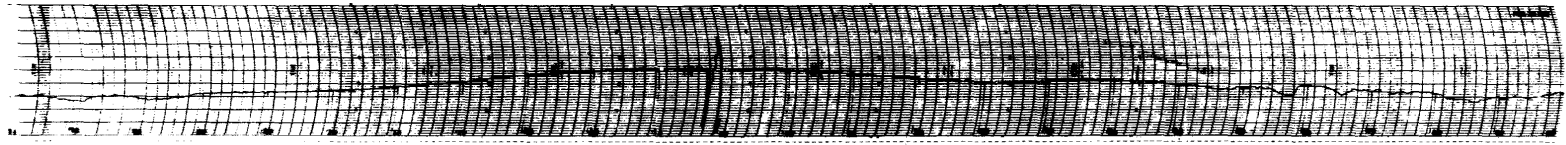
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

NOV 1971

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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

DEC 1971

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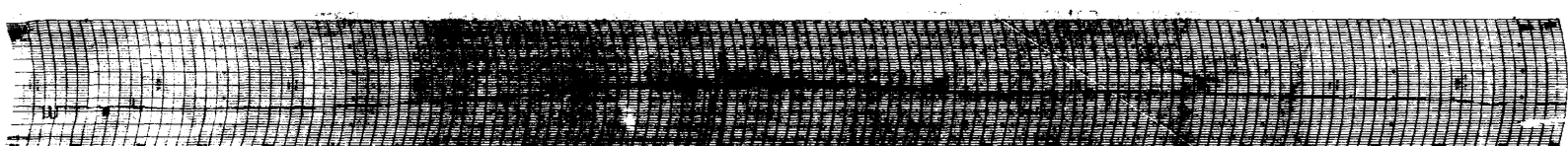
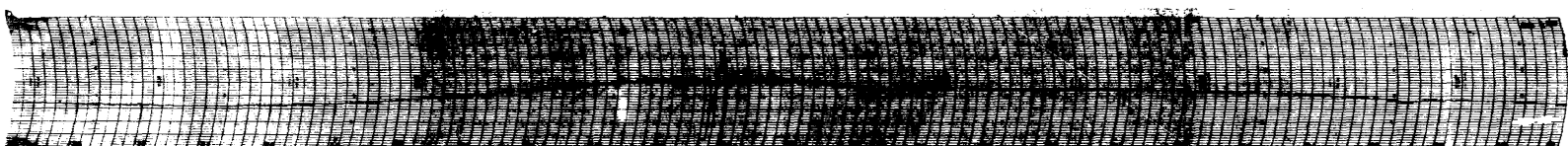
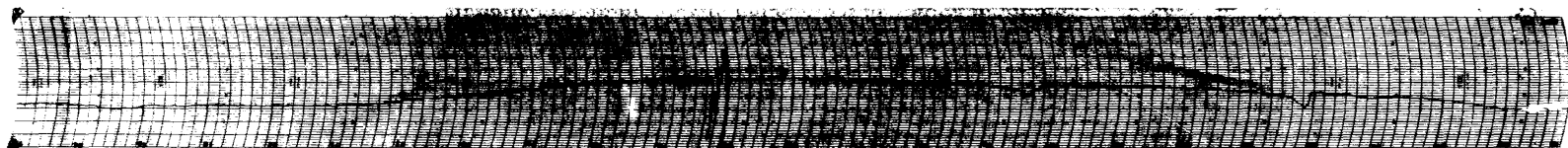
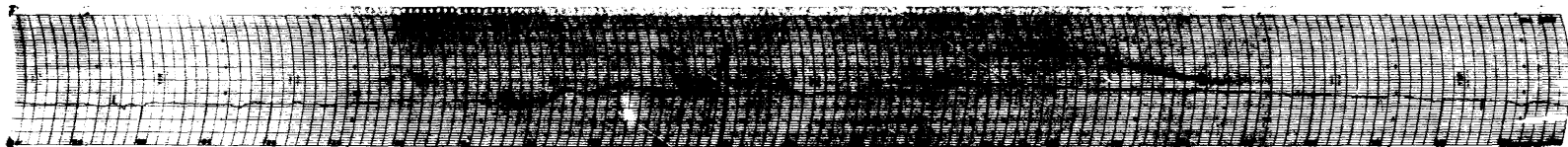
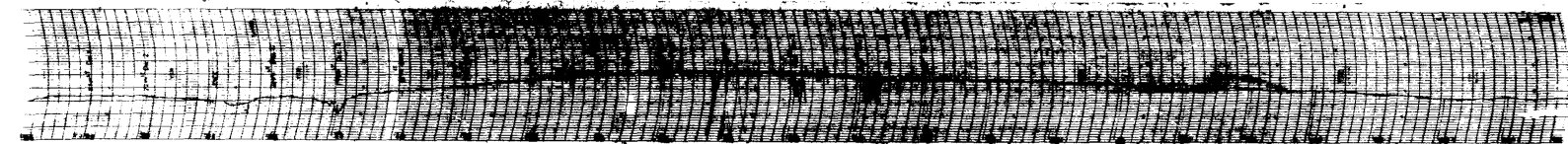
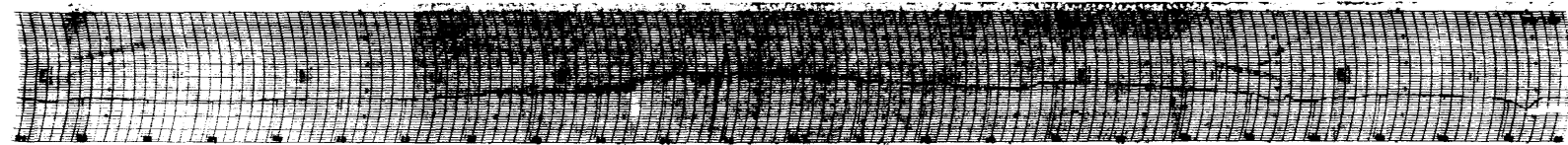
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

DEC 1971

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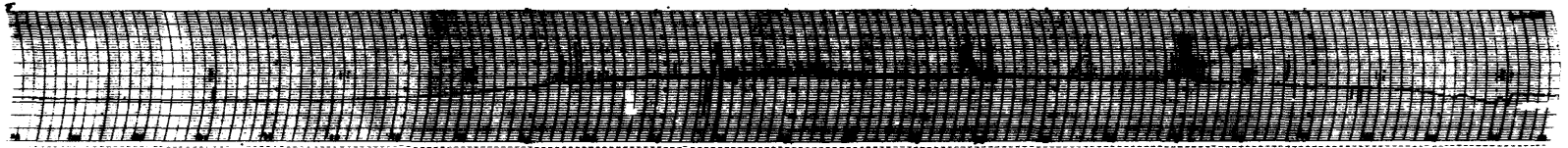
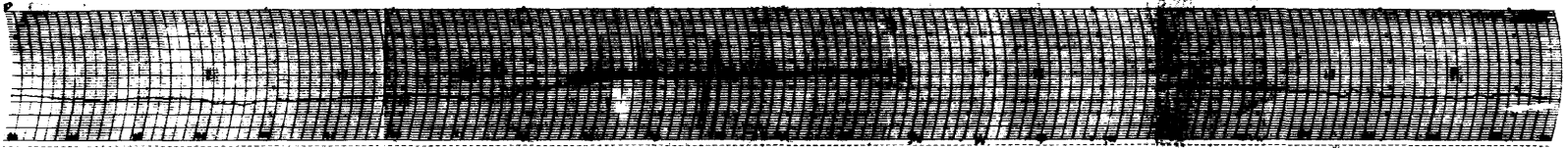
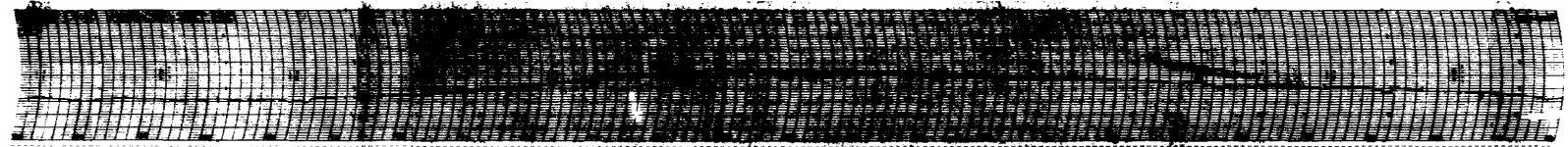
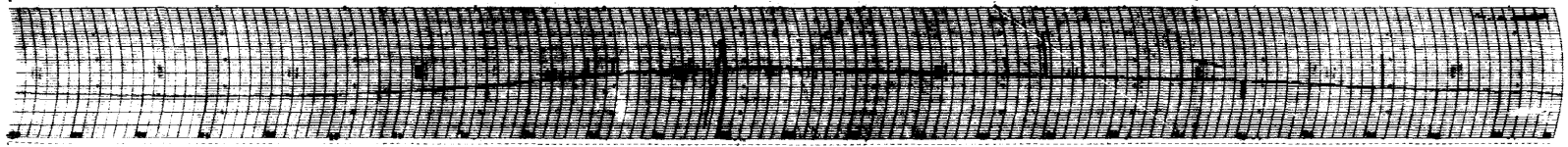
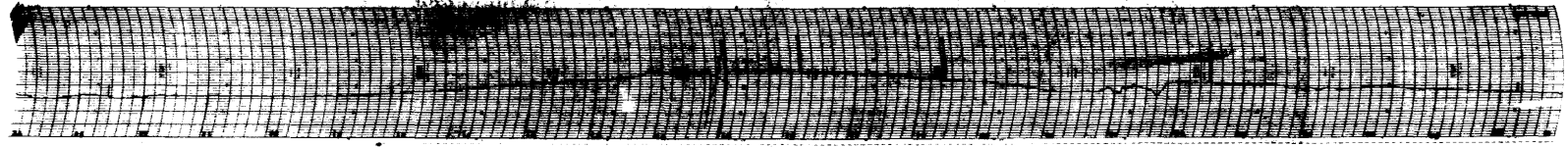
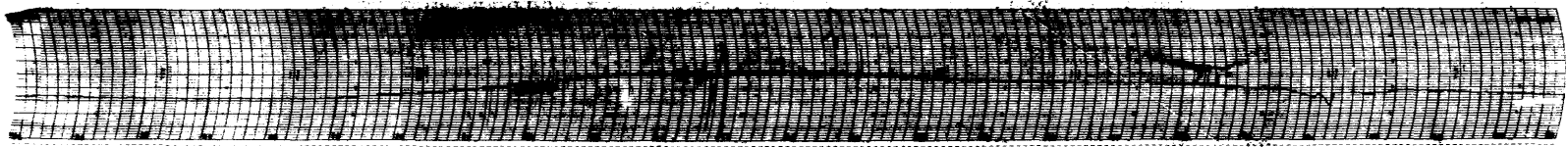
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

DEC 1971

15

16

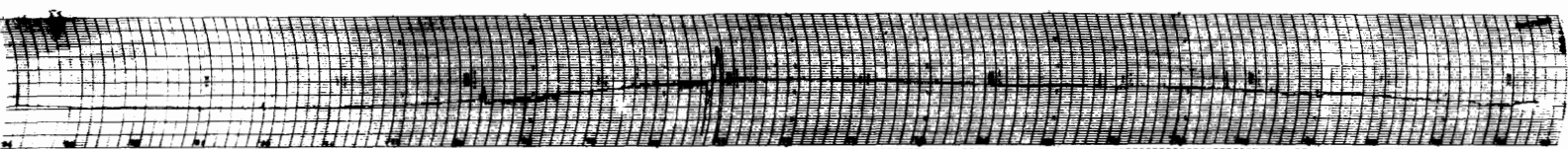
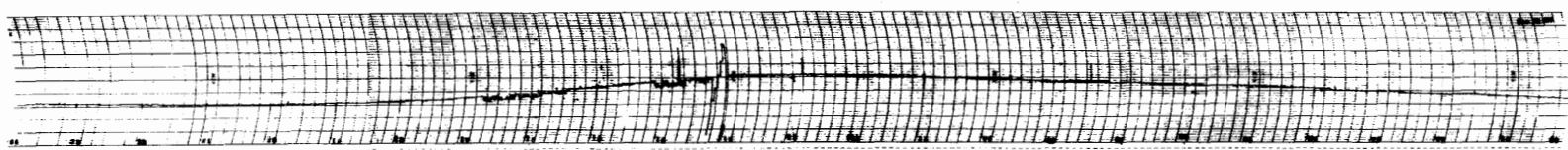
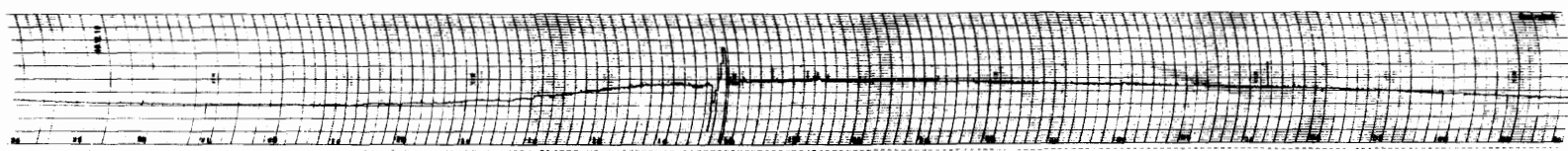
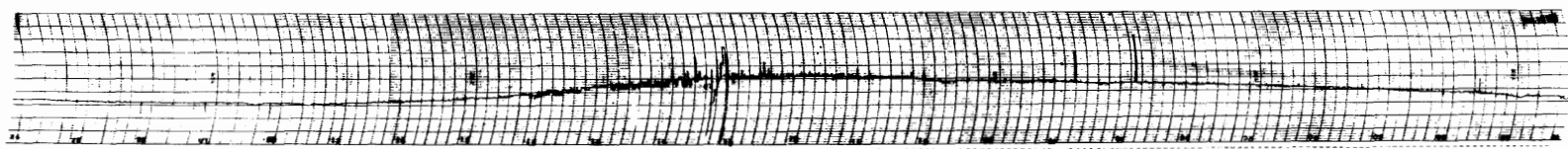
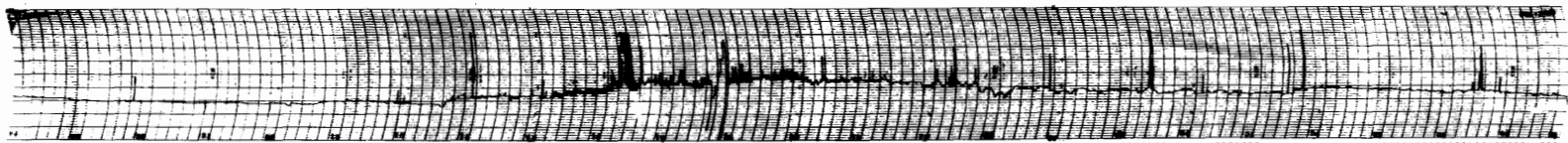
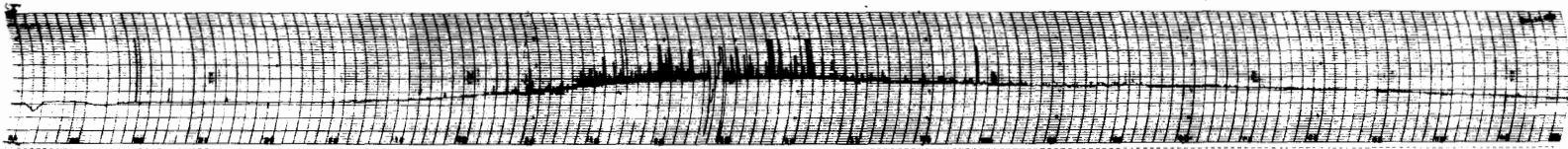
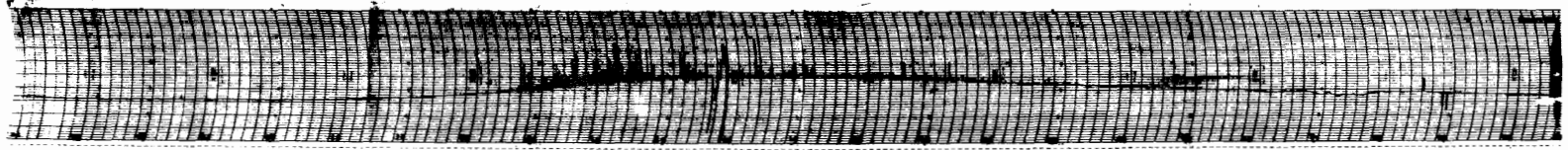
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

DEC 1971

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23

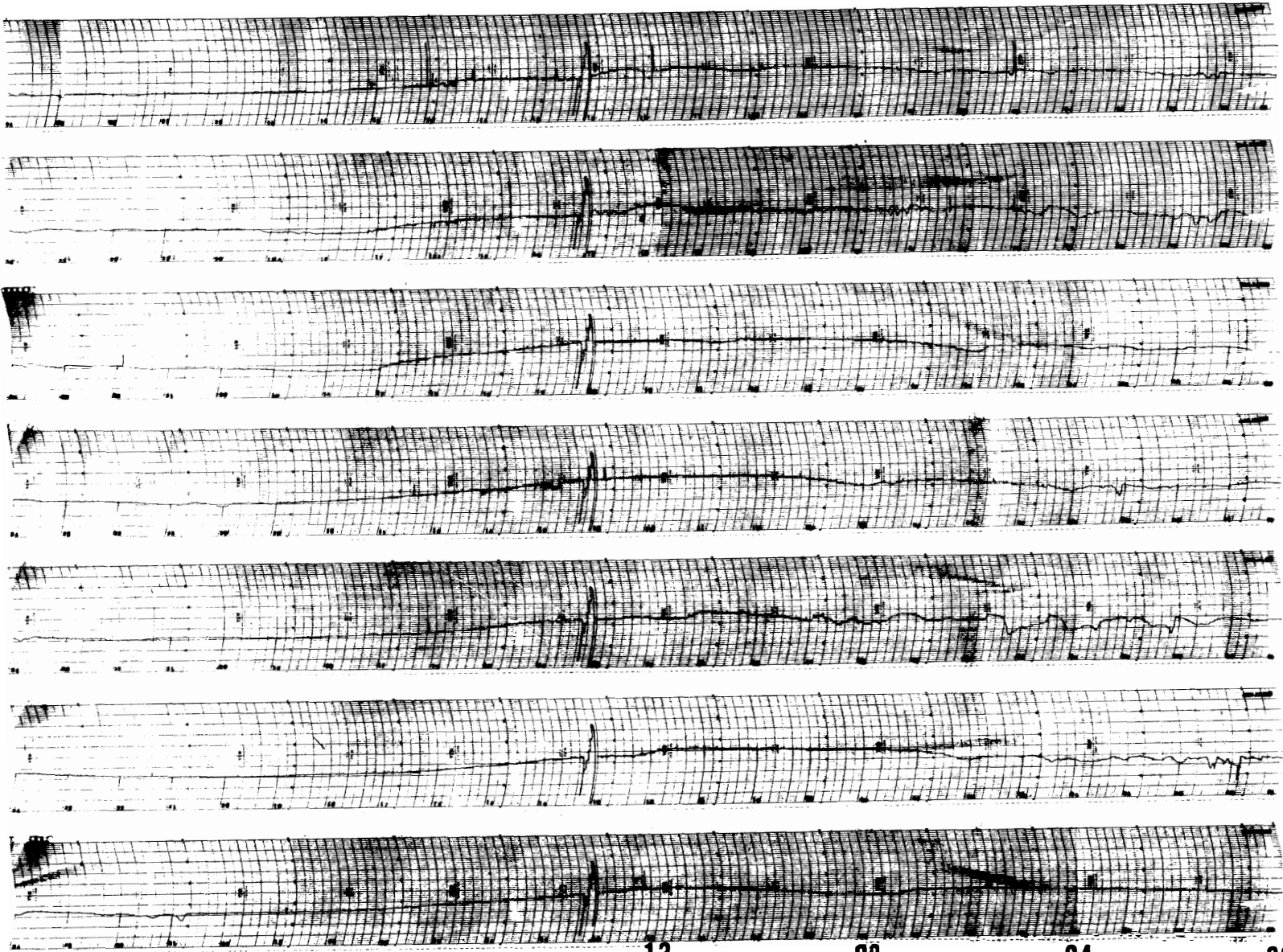
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24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

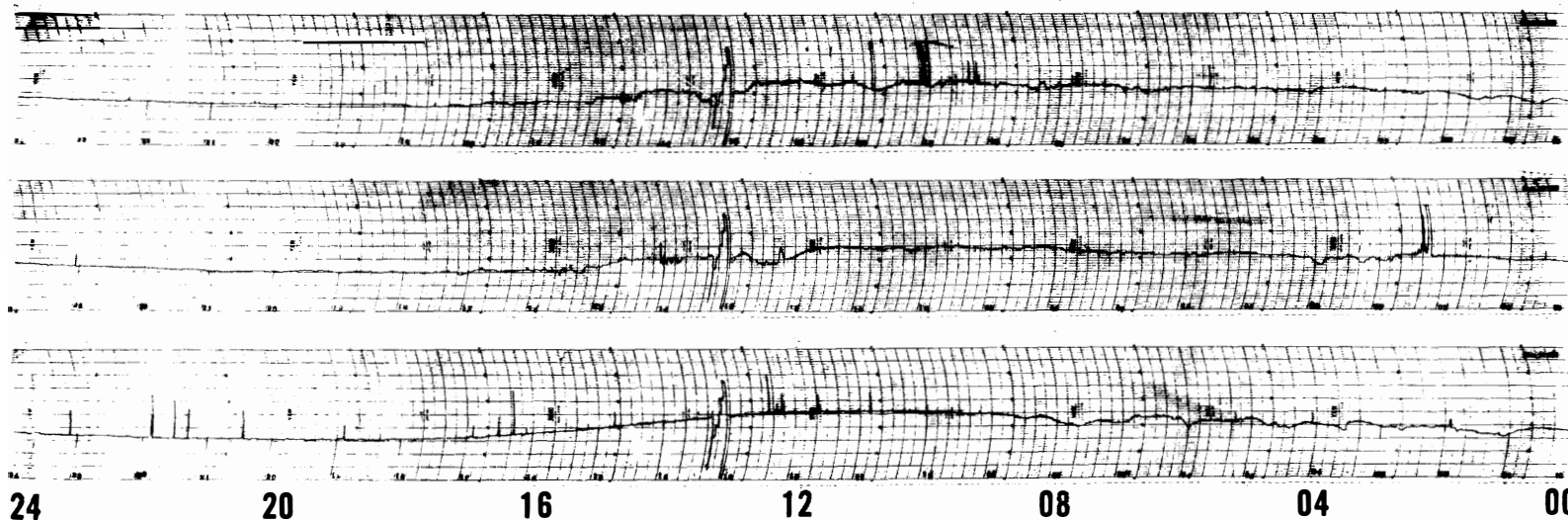
30MHz COSMIC NOISE

DEC 1971

29

30

31



45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

13. 0620-1020 failure of equipment.