

Riometer Records of 30 MHz Cosmic Noise at  
Syowa Station, Antarctica in 1972

Susumu ISOZAKI and Shigeru MIYAZAKI

(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 to December 31, 1972 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 1972

Takanobu OGATA (Radio Research Laboratories)

Masami OSE (Radio Research Laboratories)

February to December 1972

Susumu ISOZAKI (Radio Research Laboratories)

Shigeru MIYAZAKI (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 (8D-2V) of 80 meter in length. The elements of the antenna are oriented in the east-west direction.

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.

The maximum part in the diurnal variation of the received intensity is due to the radiation from the galactic center. Figure 1 shows the shift of daily maximum time, or the difference between the siderial and the mean solar time, while the minimum part does not always agree exactly with that of the cosmic radio emission.

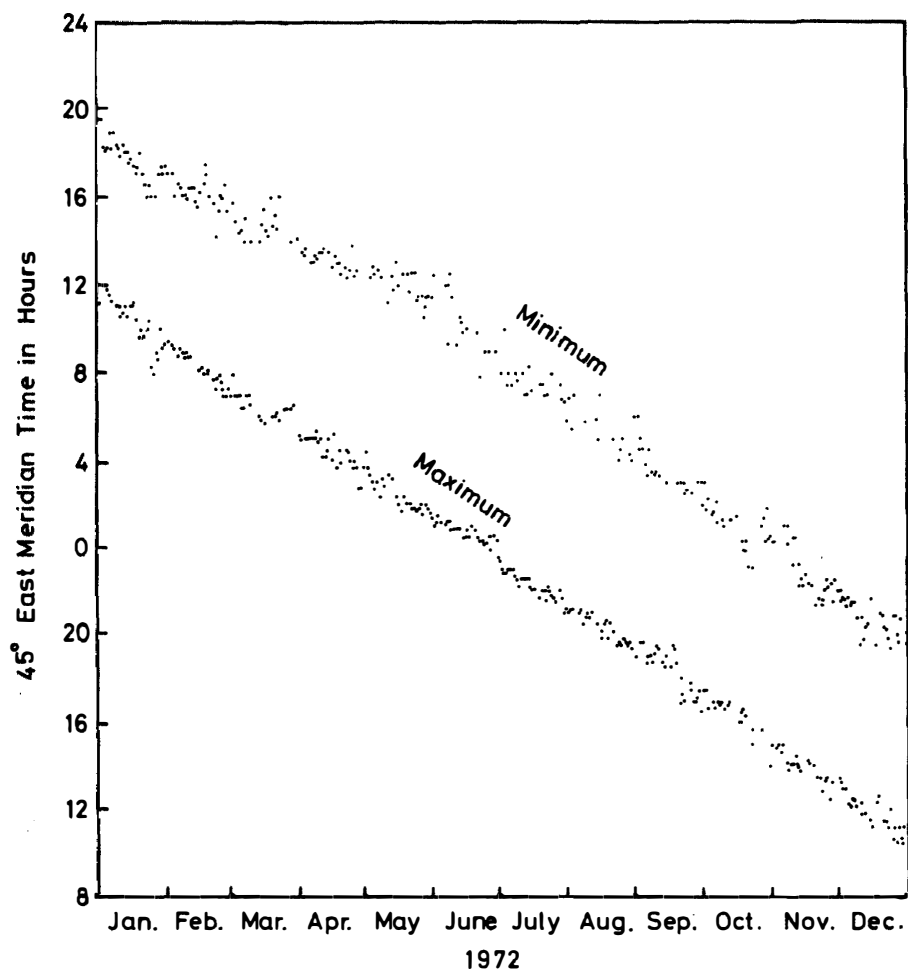
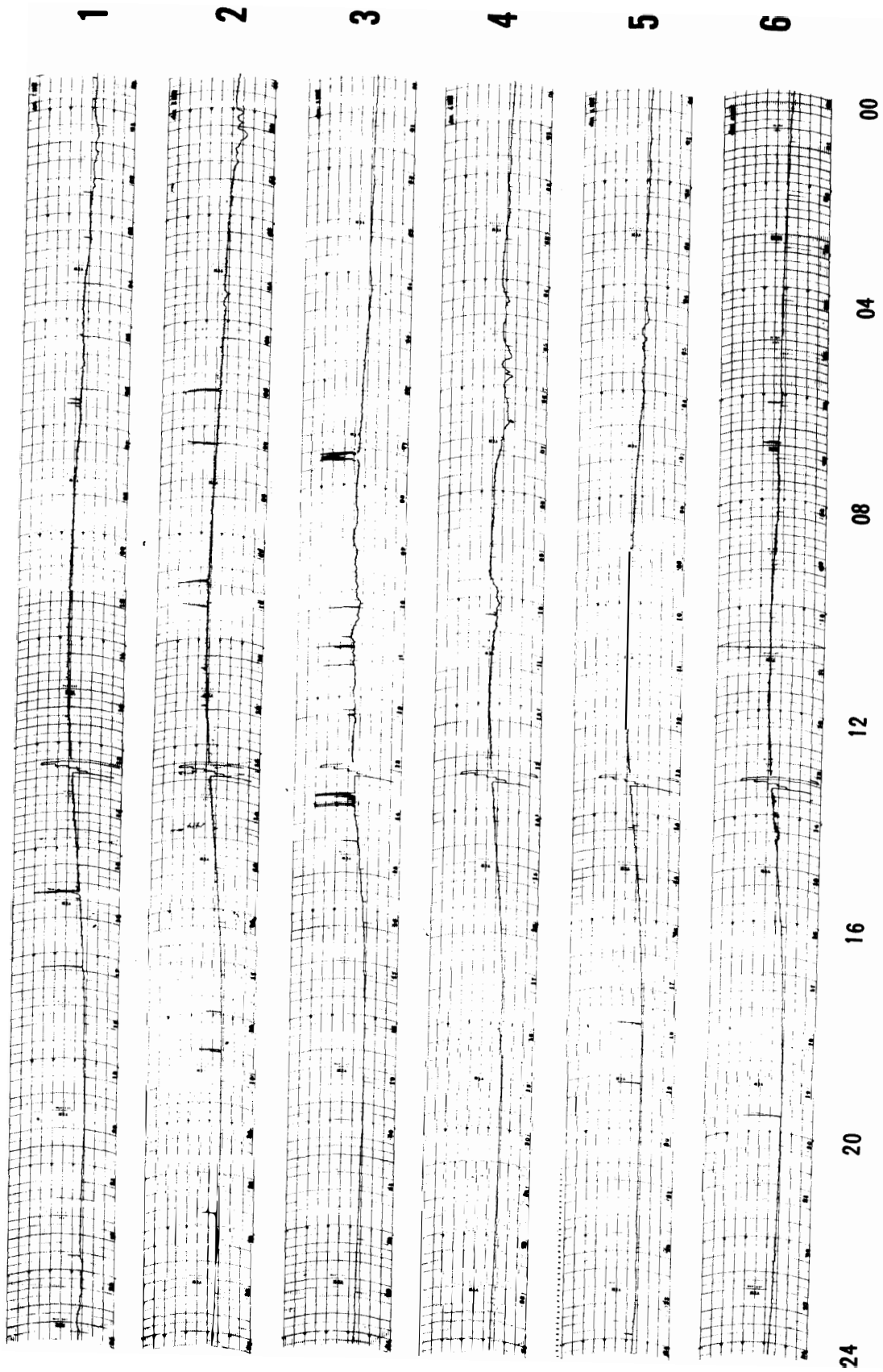


Fig. 1. The maximum and minimum time of the received intensity.

## References

- Ishizawa, K. (1970): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica from February 1968 to January 1969. JARE Data Rep., No. 7 (Ionosphere), 65pp.
- Ogata, T. and M. Ose (1972): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica in 1971. JARE Data Rep., No. 18 (Ionosphere), 62pp.
- Ose, M. and I. Nishimuta (1968): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica from February 1967 to February 1968. JARE Data Rep., No. 2 (Ionosphere), 62pp.
- Ota, Y. (1970): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica 1969. JARE Data Rep., No. 8 (Ionosphere), 74pp.
- Shiro, I. and T. Sakamoto (1971): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica in 1970. JARE Data Rep., No. 14 (Ionosphere), 62pp.

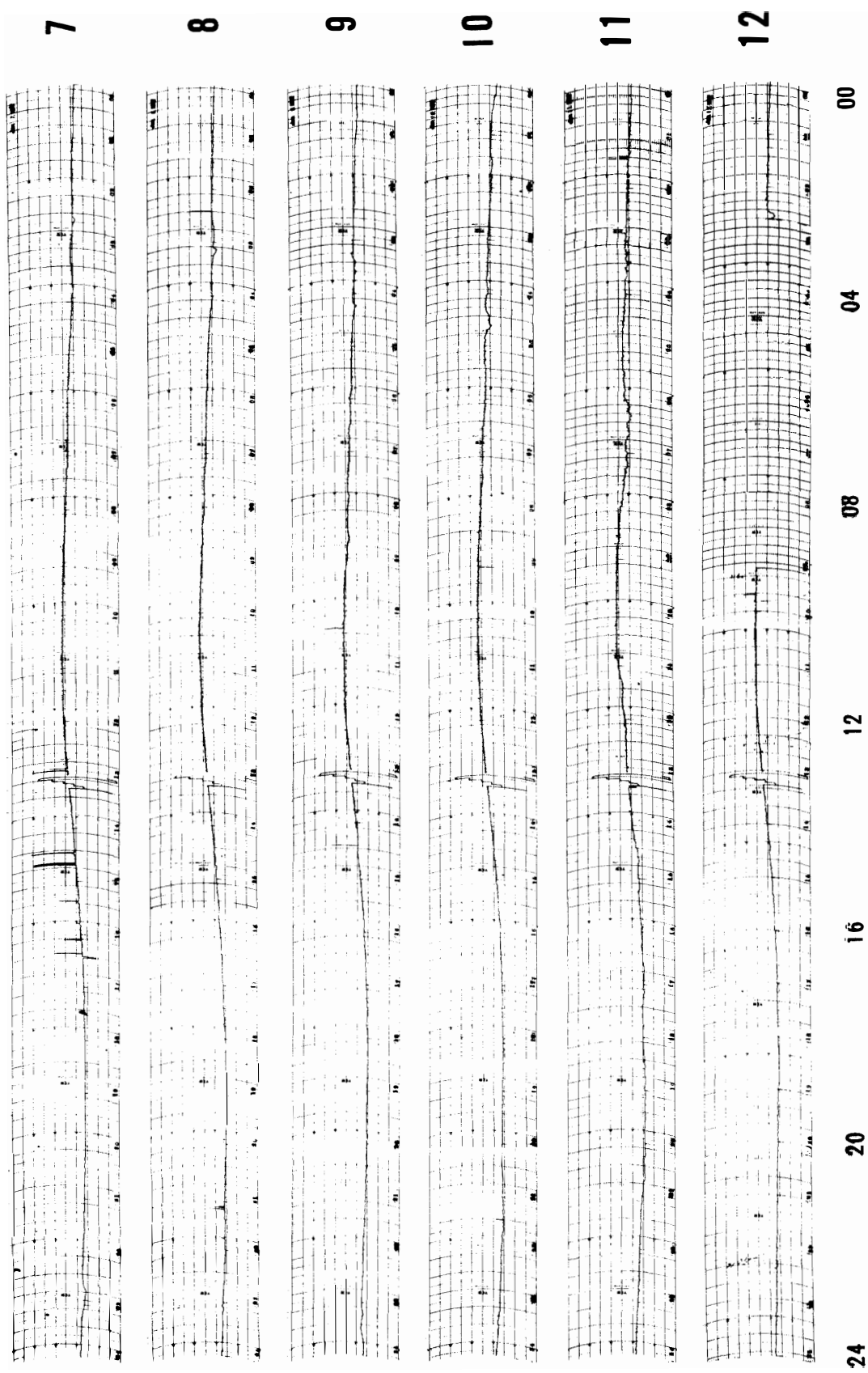
JAN 1972



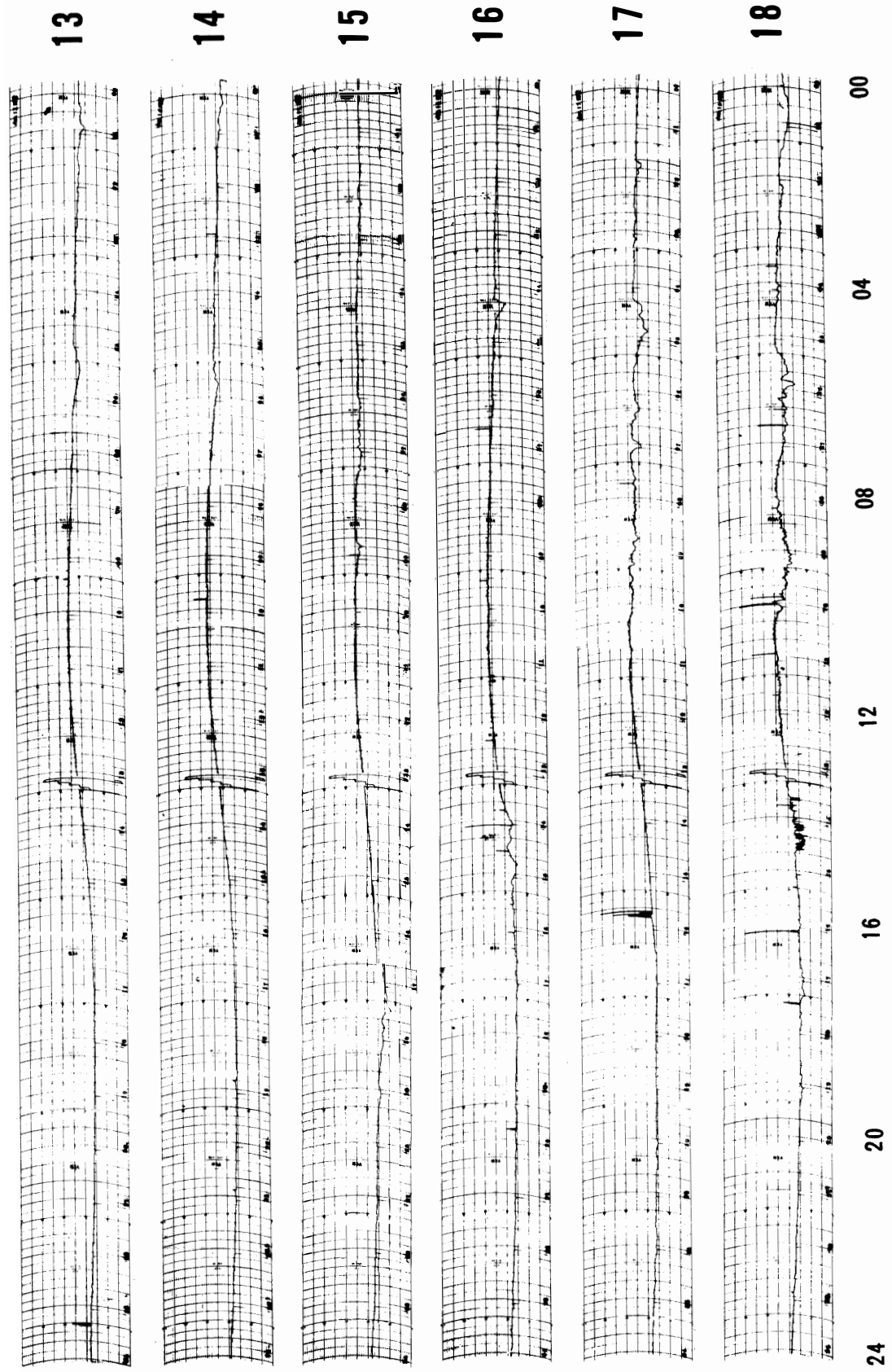
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

JAN 1972



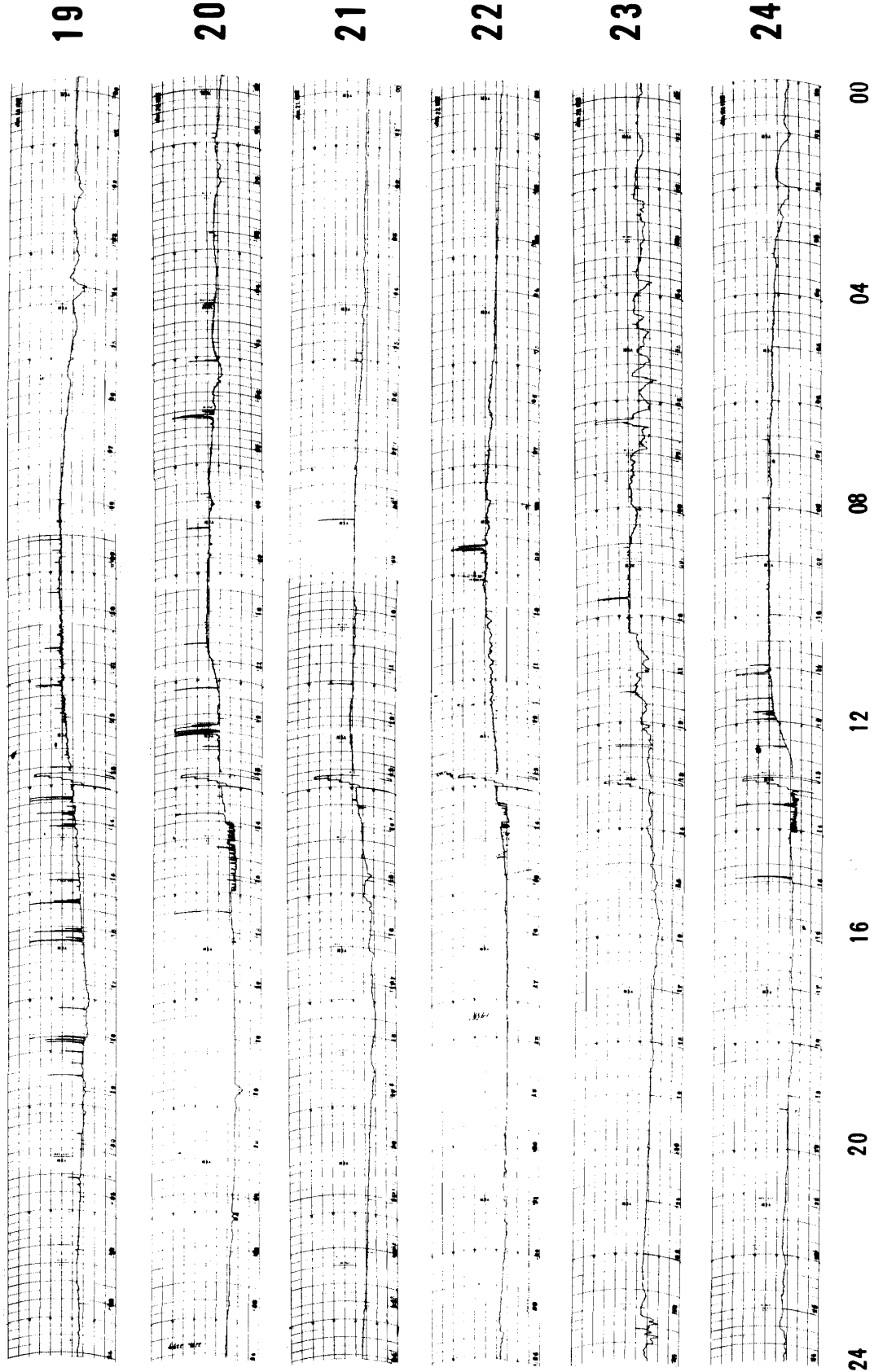
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

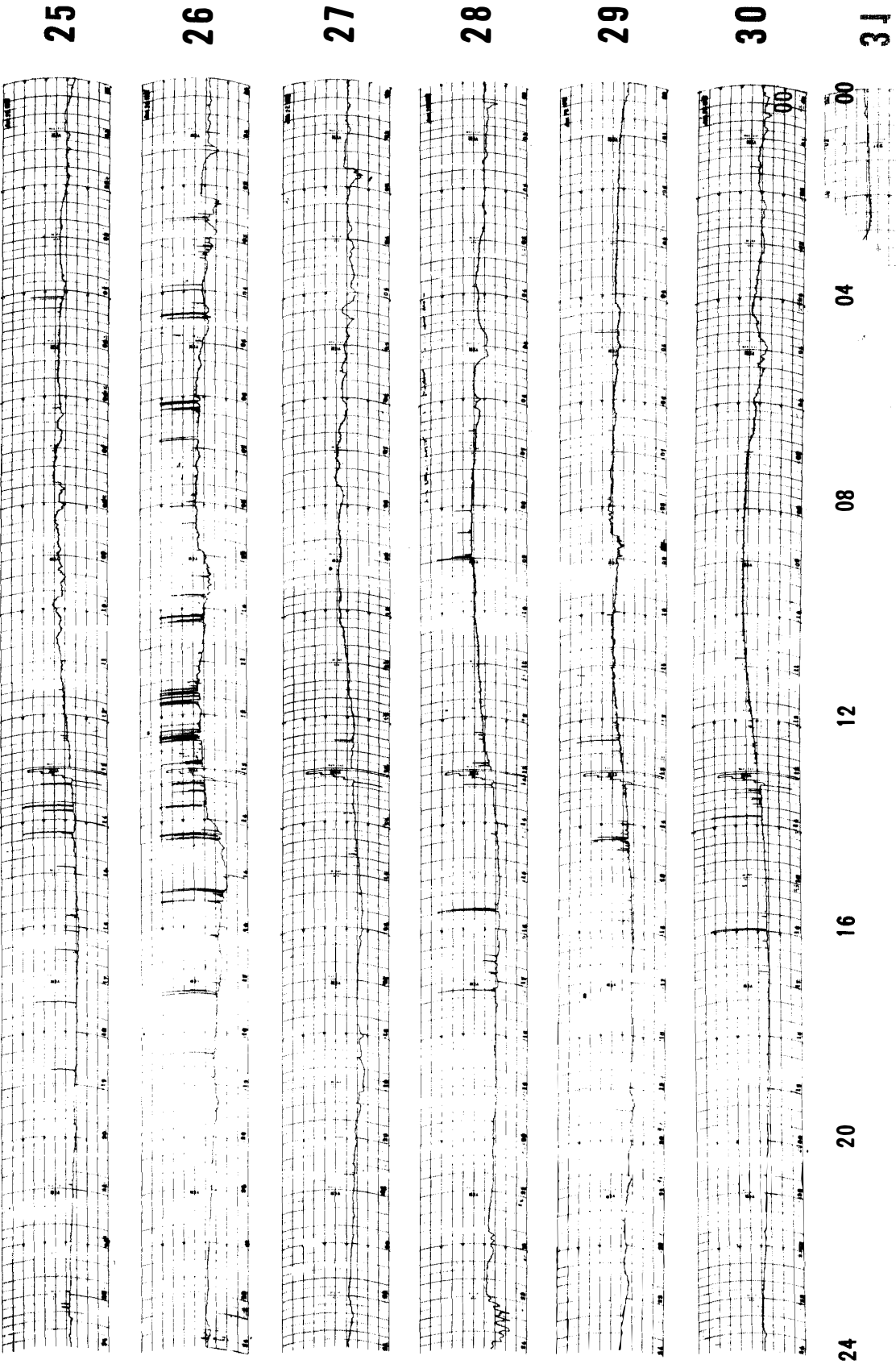
JAN 1972





JAN 1972

JAN 1972

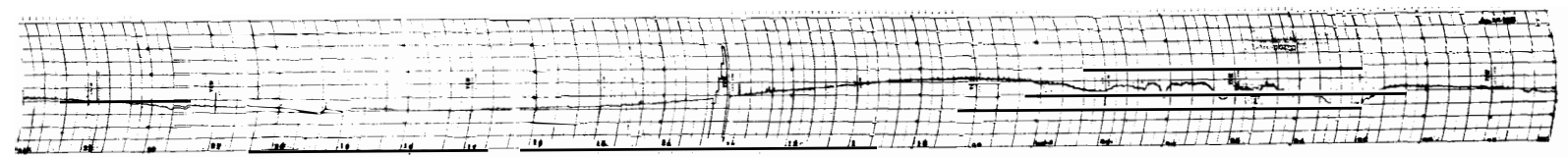


30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

JAN 1972

31



24                    20                    16                    12                    08                    04                    00

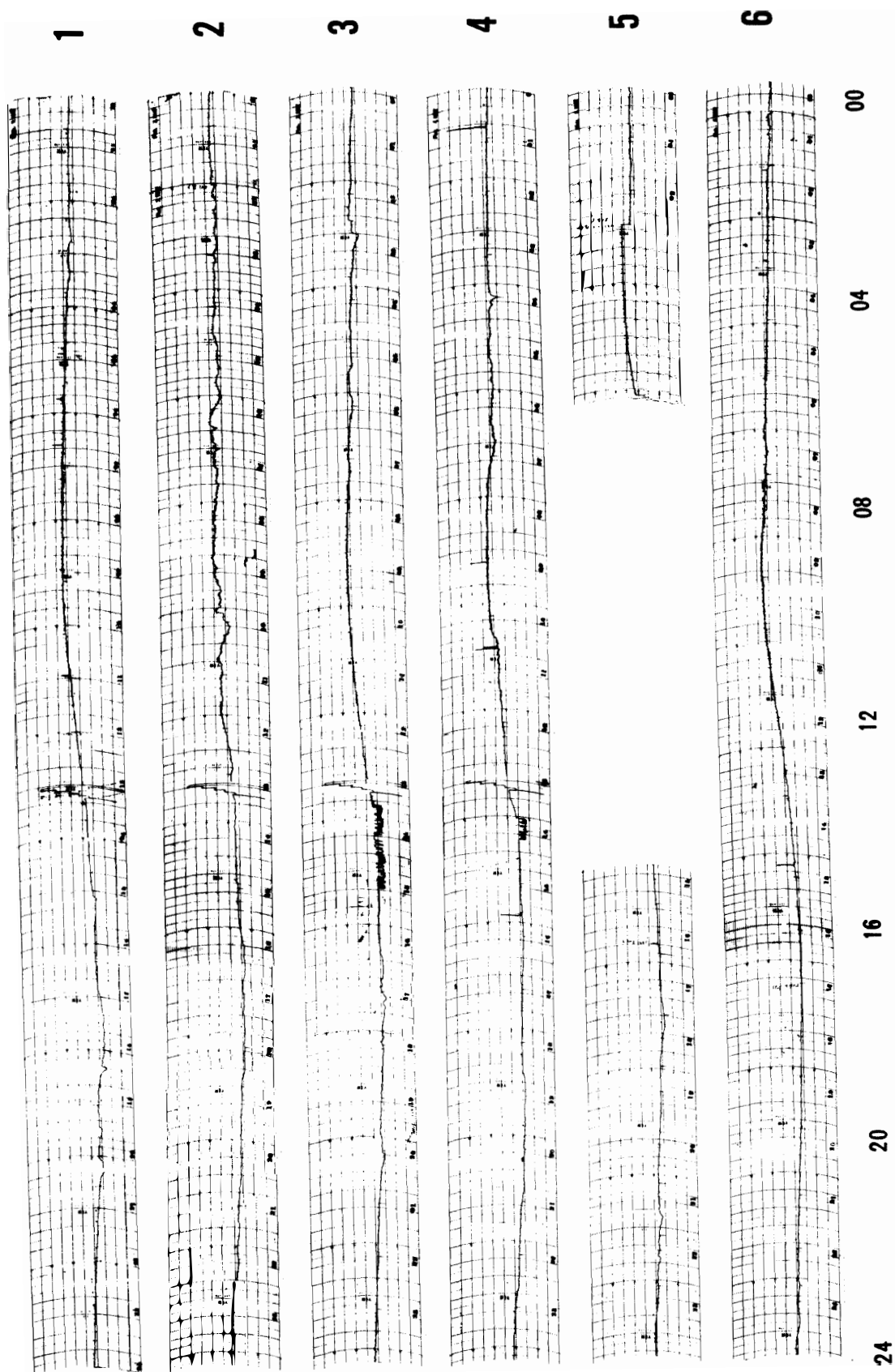
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30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

12th. 0235-0912 failure of equipment.

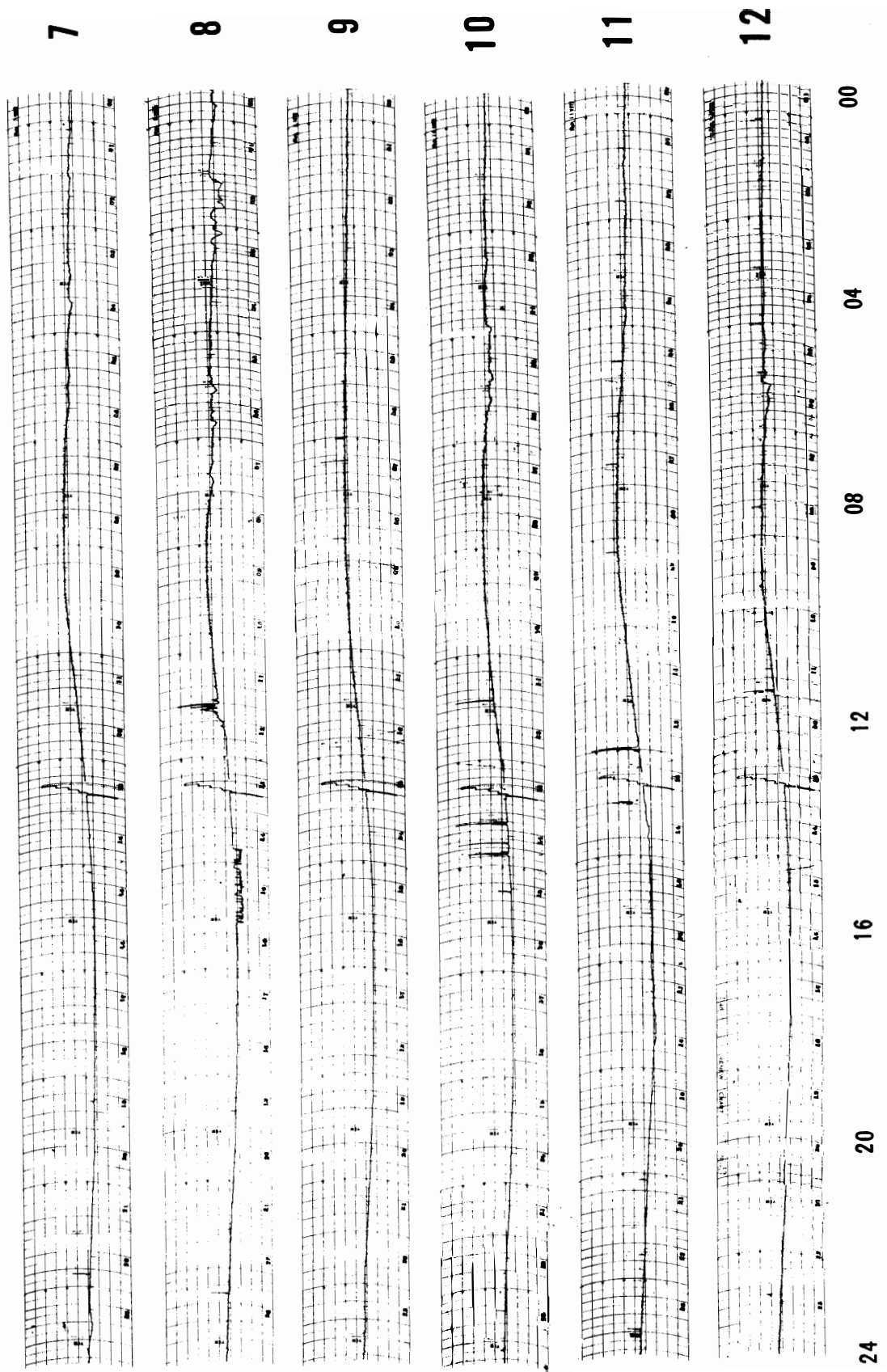
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

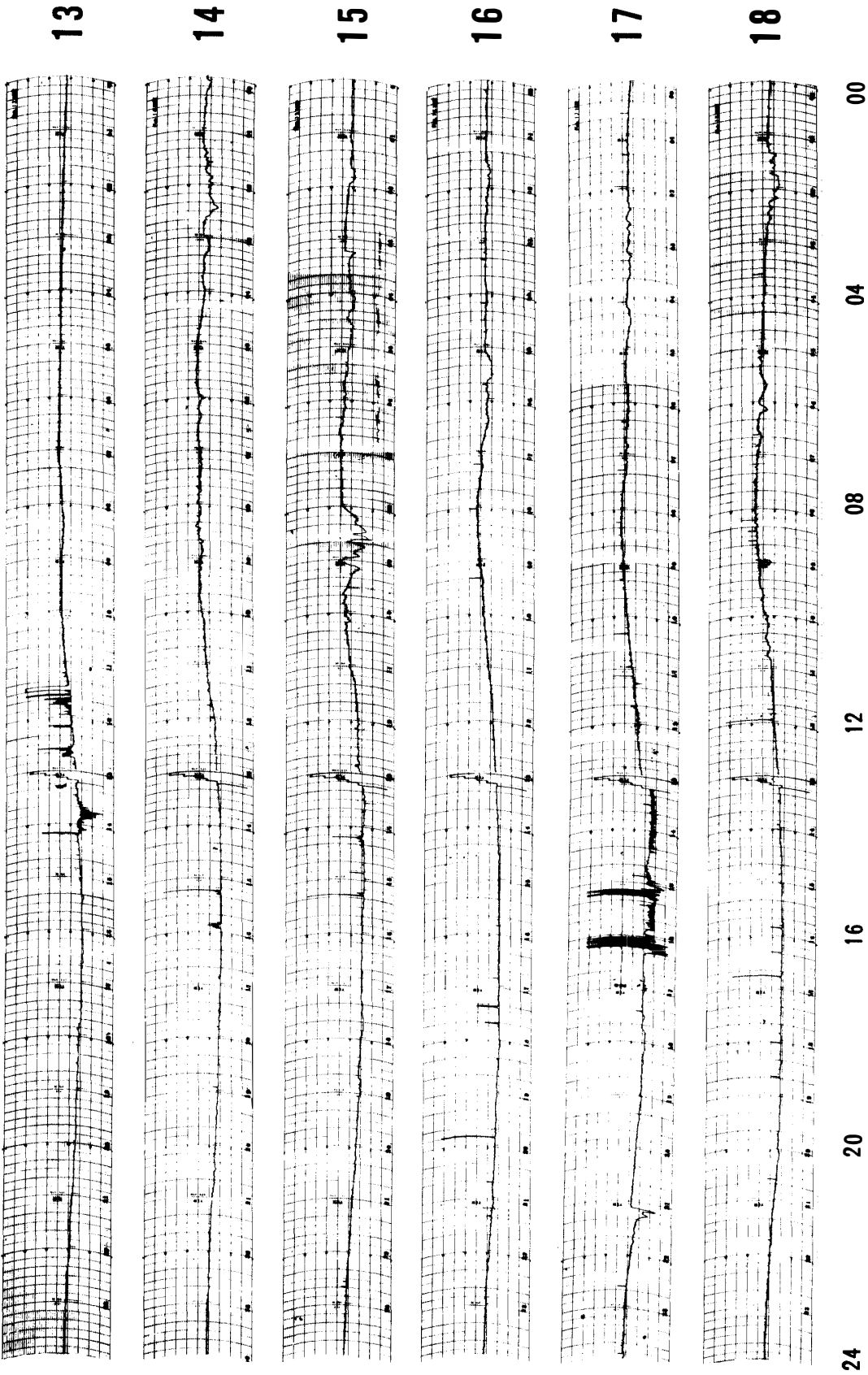
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

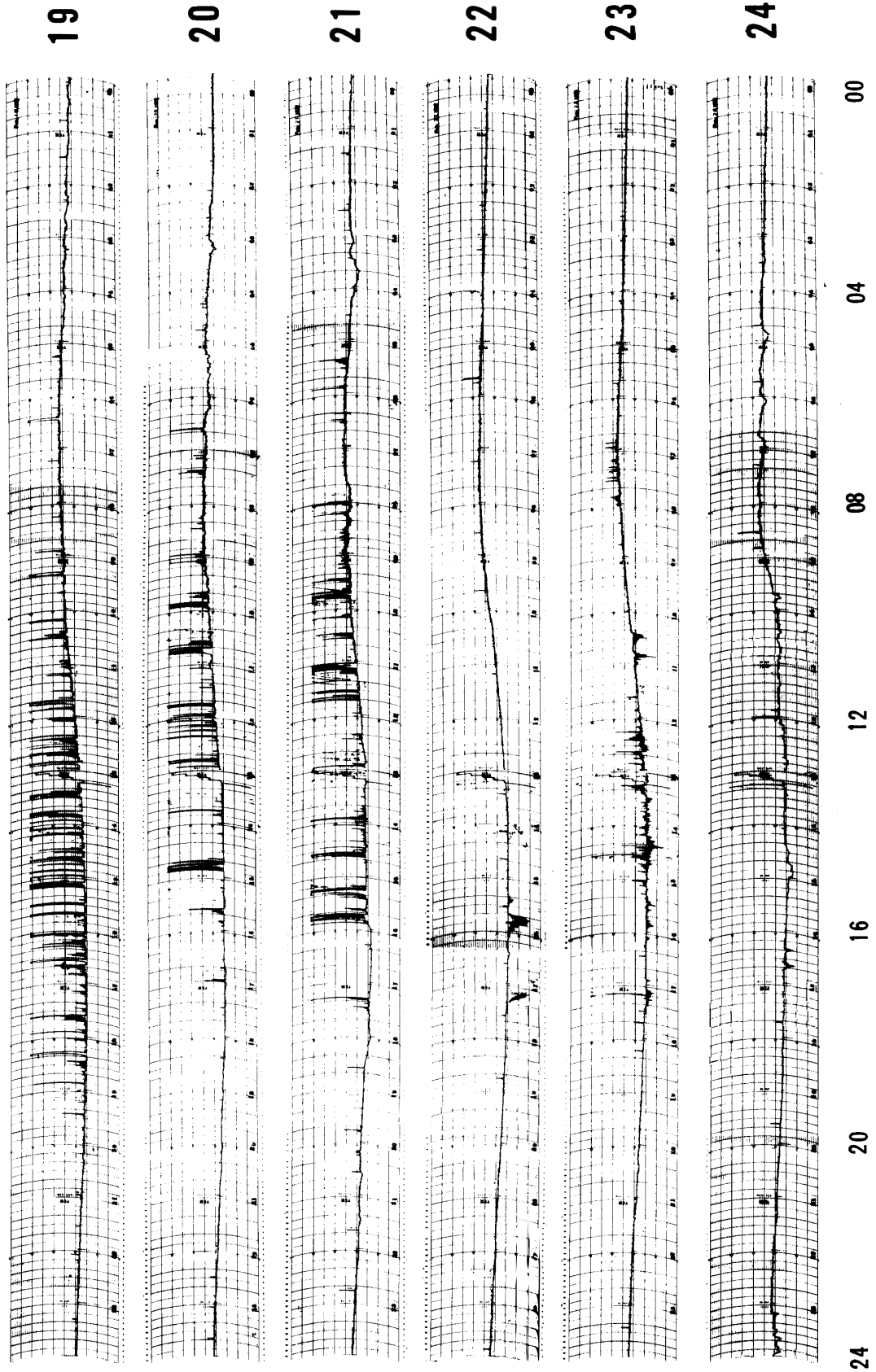
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30MHz COSMIC NOISE

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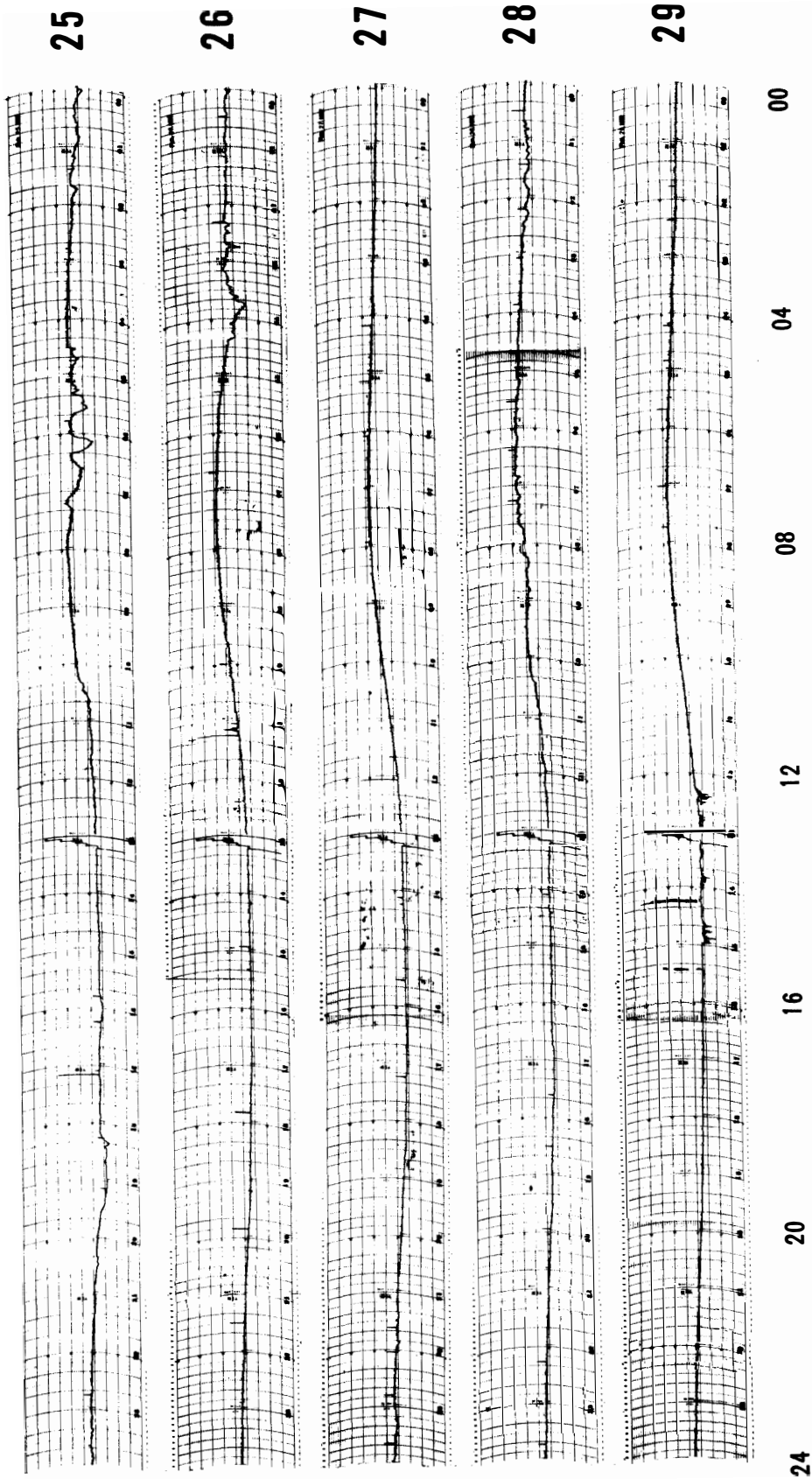
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

FEB 1972



30MHz COSMIC NOISE

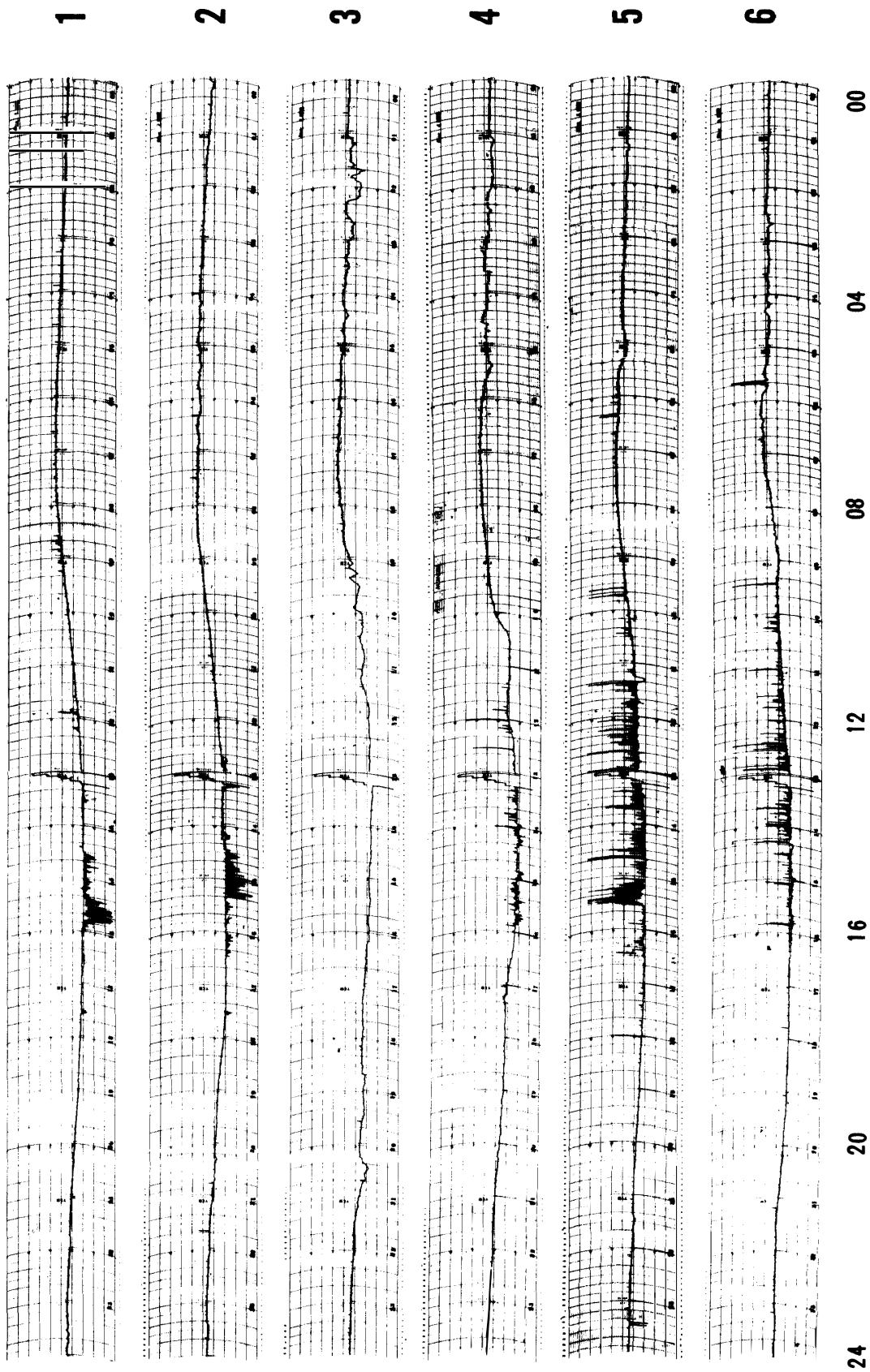
45° EAST MERIDIAN TIME IN HOURS

Cosmic noise level obscured or equipment malfunction.

|       |           |                       |
|-------|-----------|-----------------------|
| 5th.  | 0239-0739 | failure of equipment. |
|       | 1050-1440 | "                     |
| 17th. | 1314-1622 | interferences.        |
| 19th. | 0850-1900 | "                     |



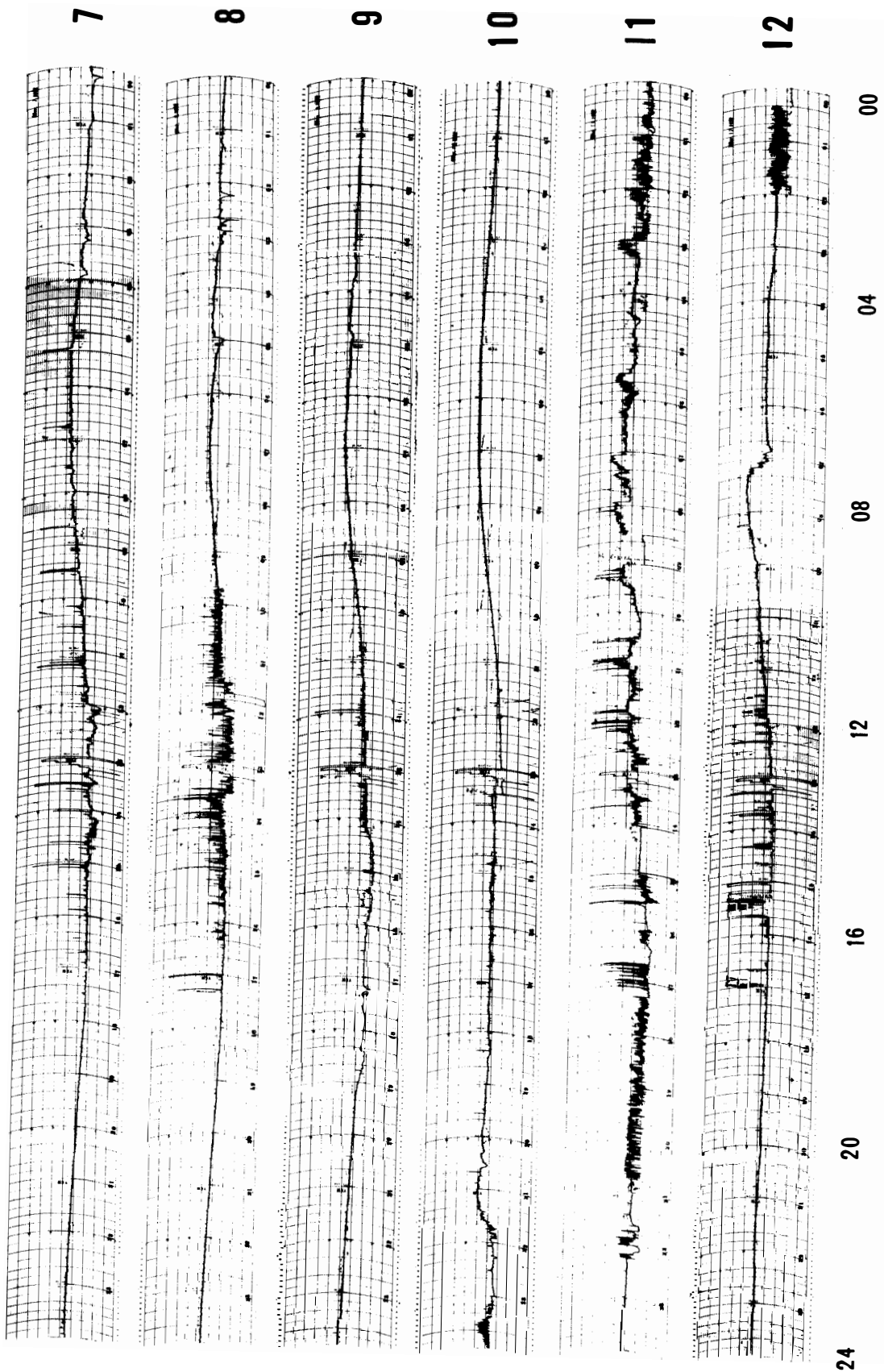
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

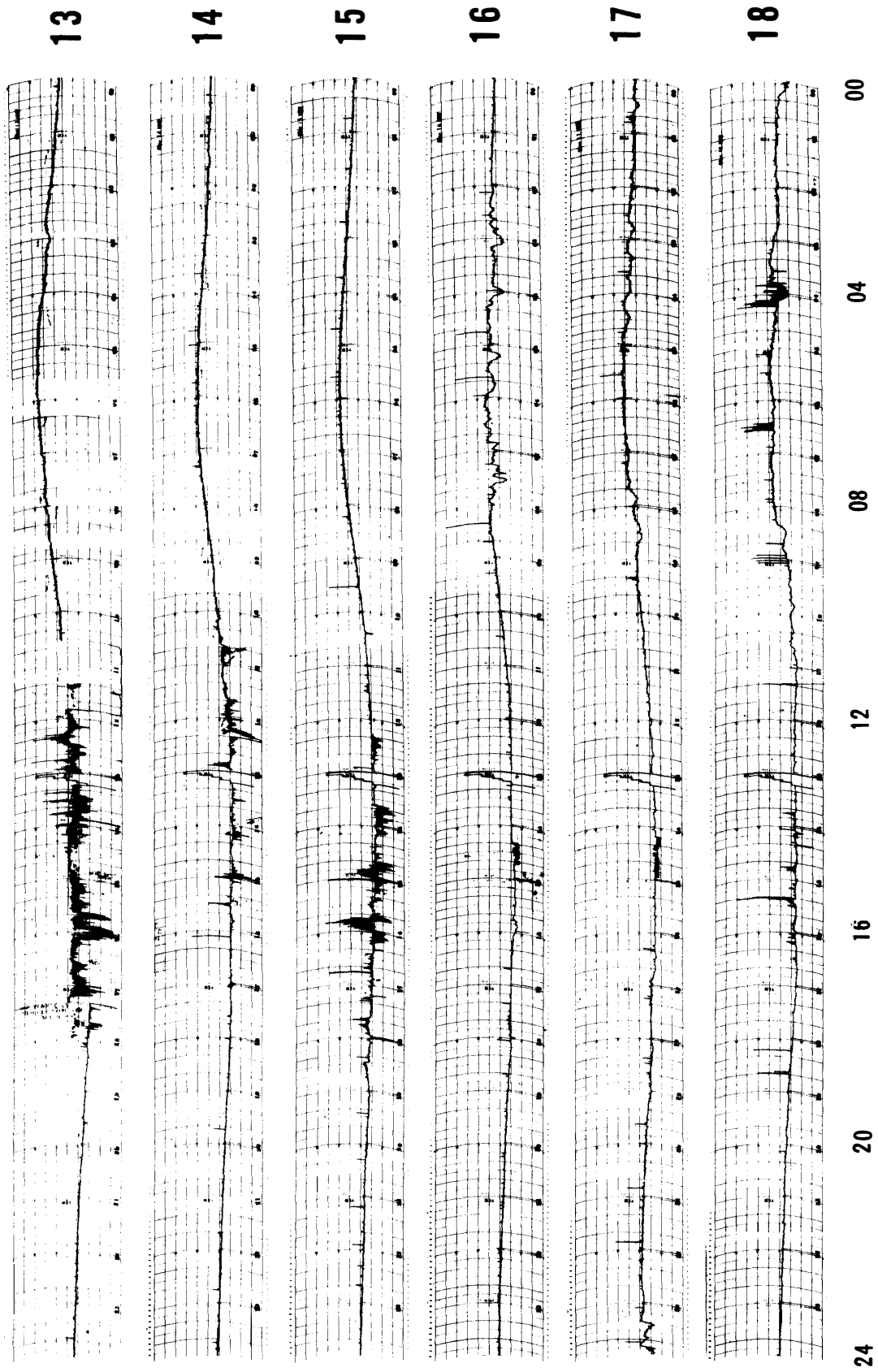
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45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

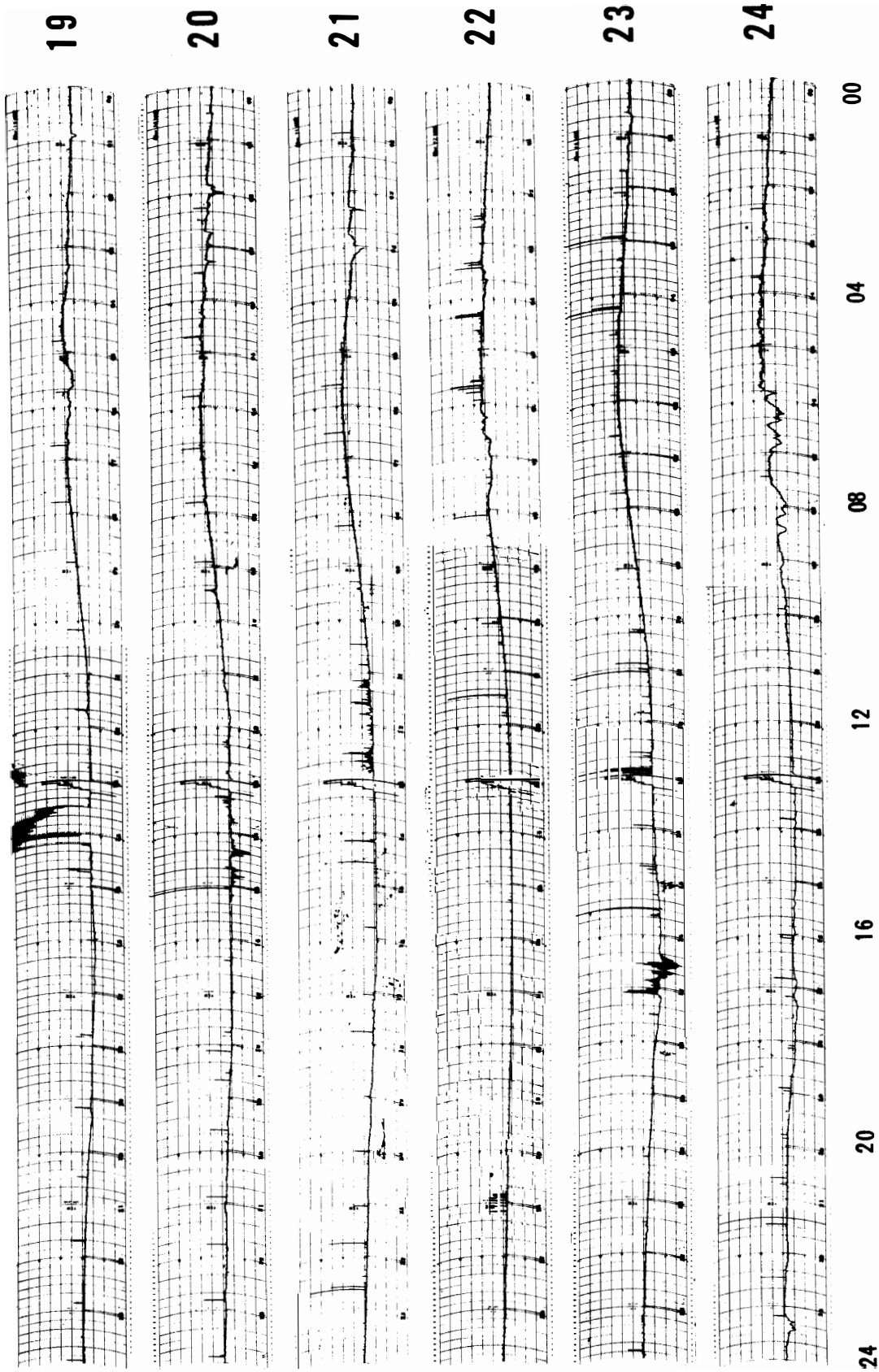
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

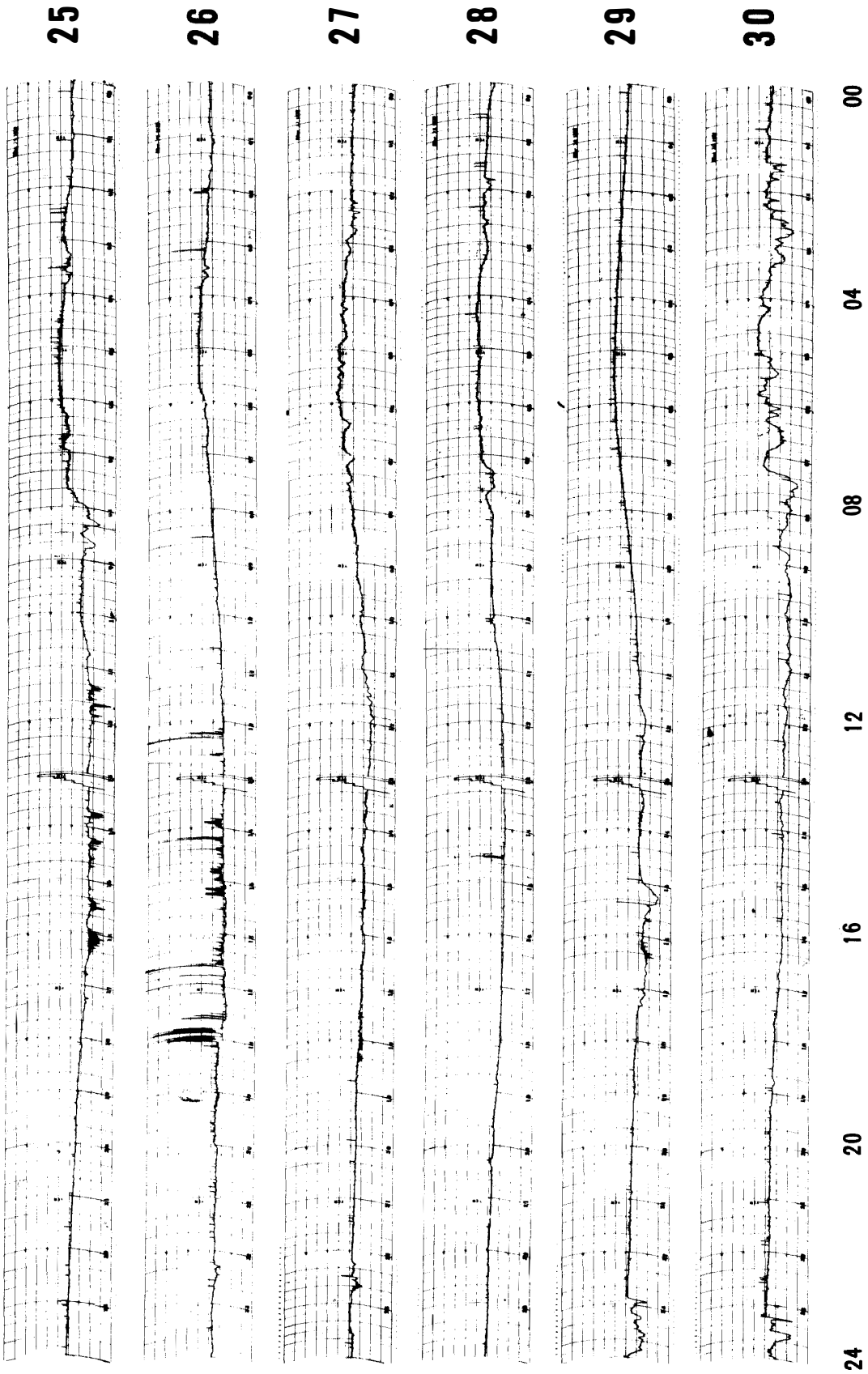
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30MHz COSMIC NOISE

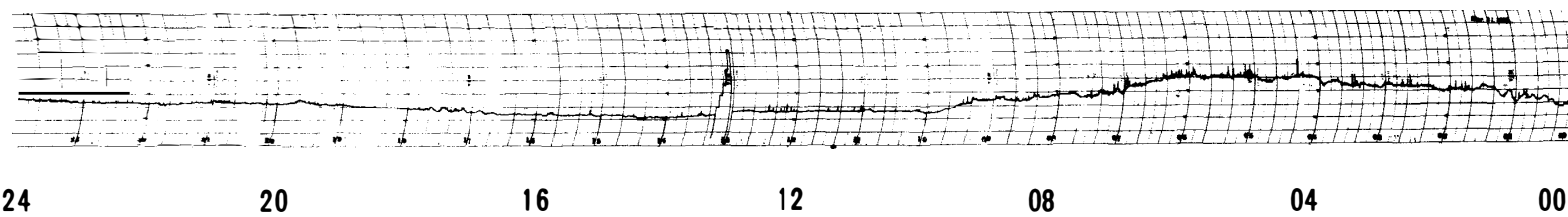
45° EAST MERIDIAN TIME IN HOURS

MAR 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



31

MAR 1972

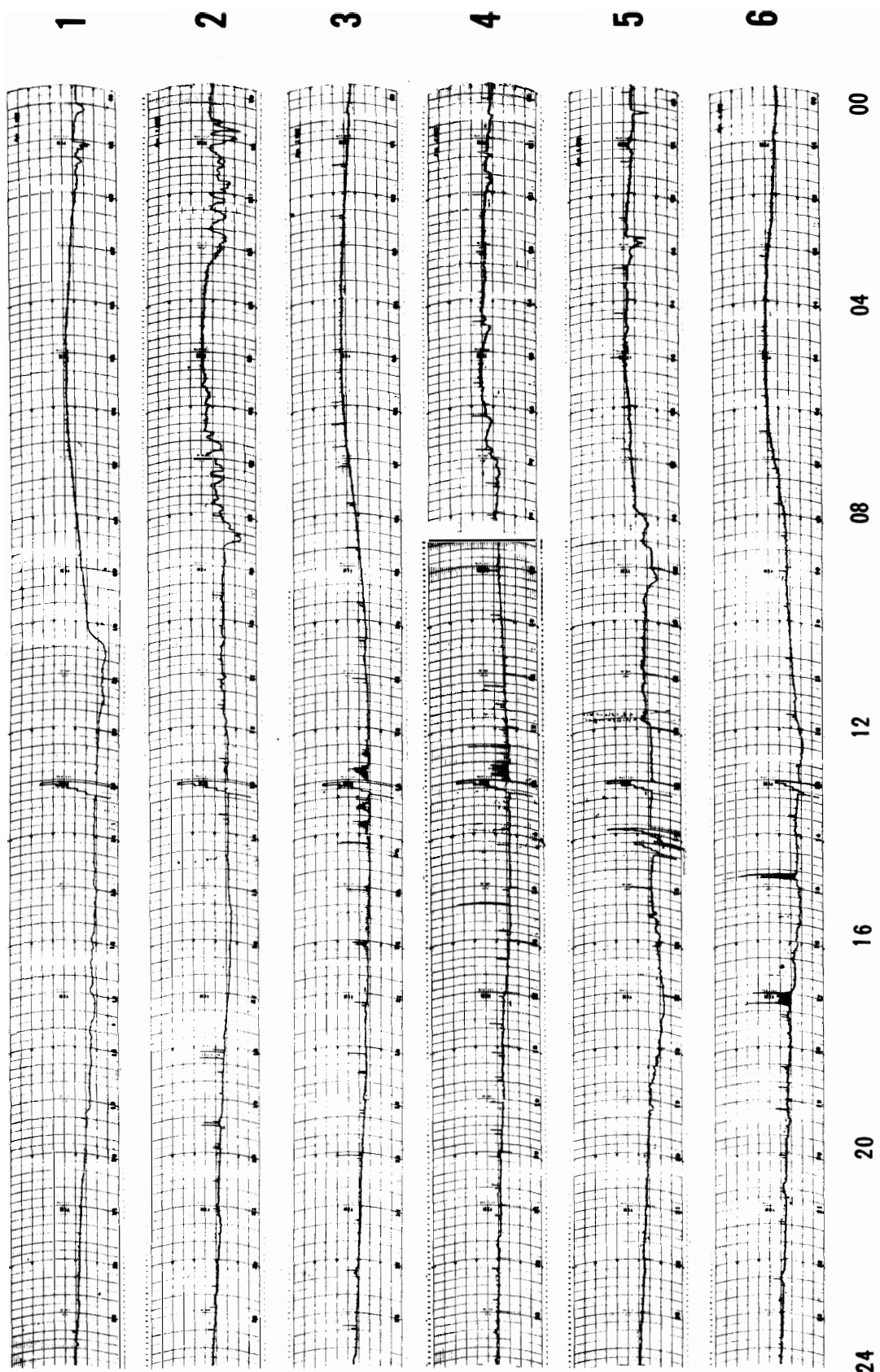
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

- 8th. 0950-1540 interferences.
- 10th. 1330-
- 13th. -1730 equipment test.
- 19th. 1330-1415 interferences.

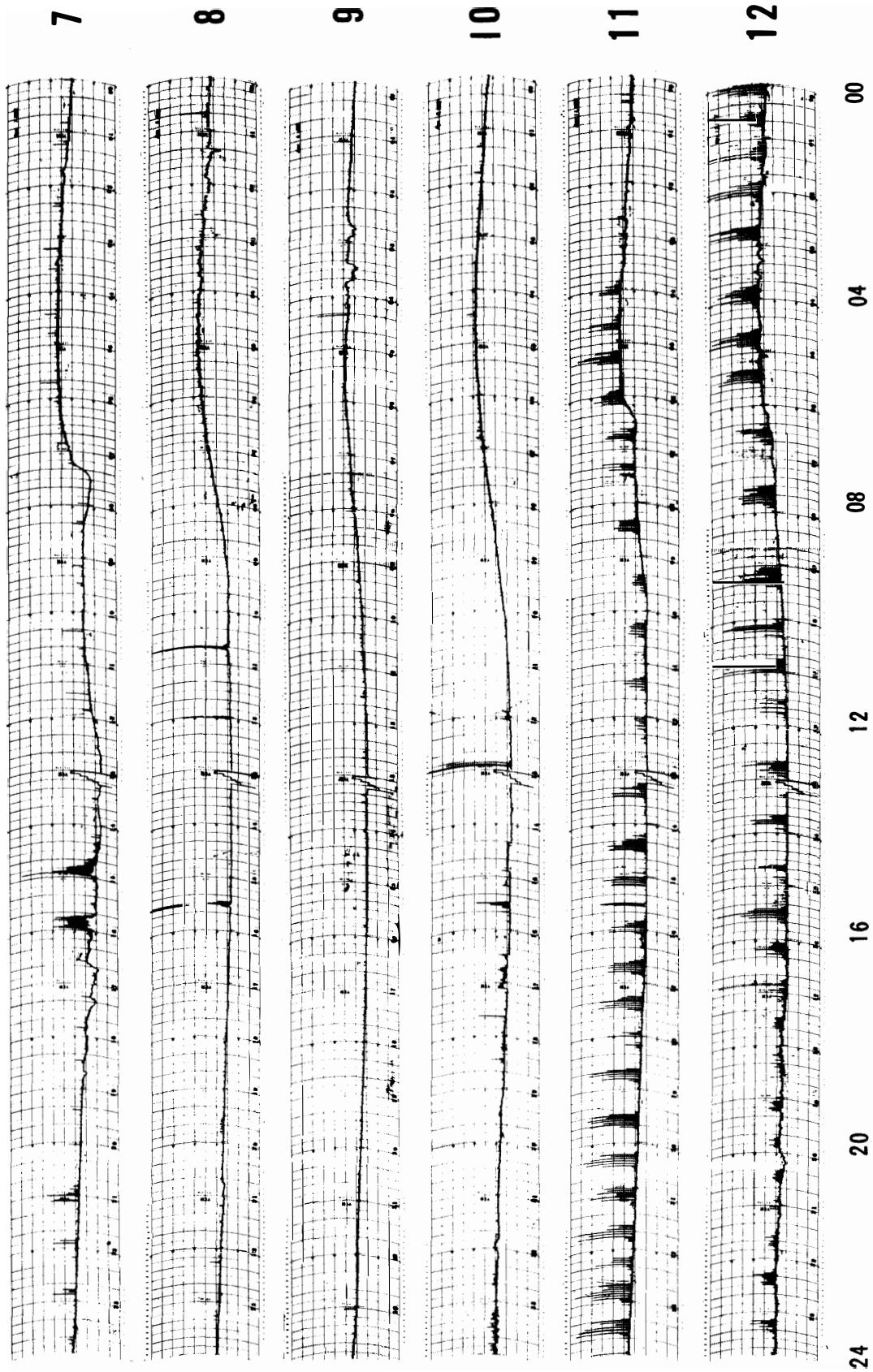
APR 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

APR 1972

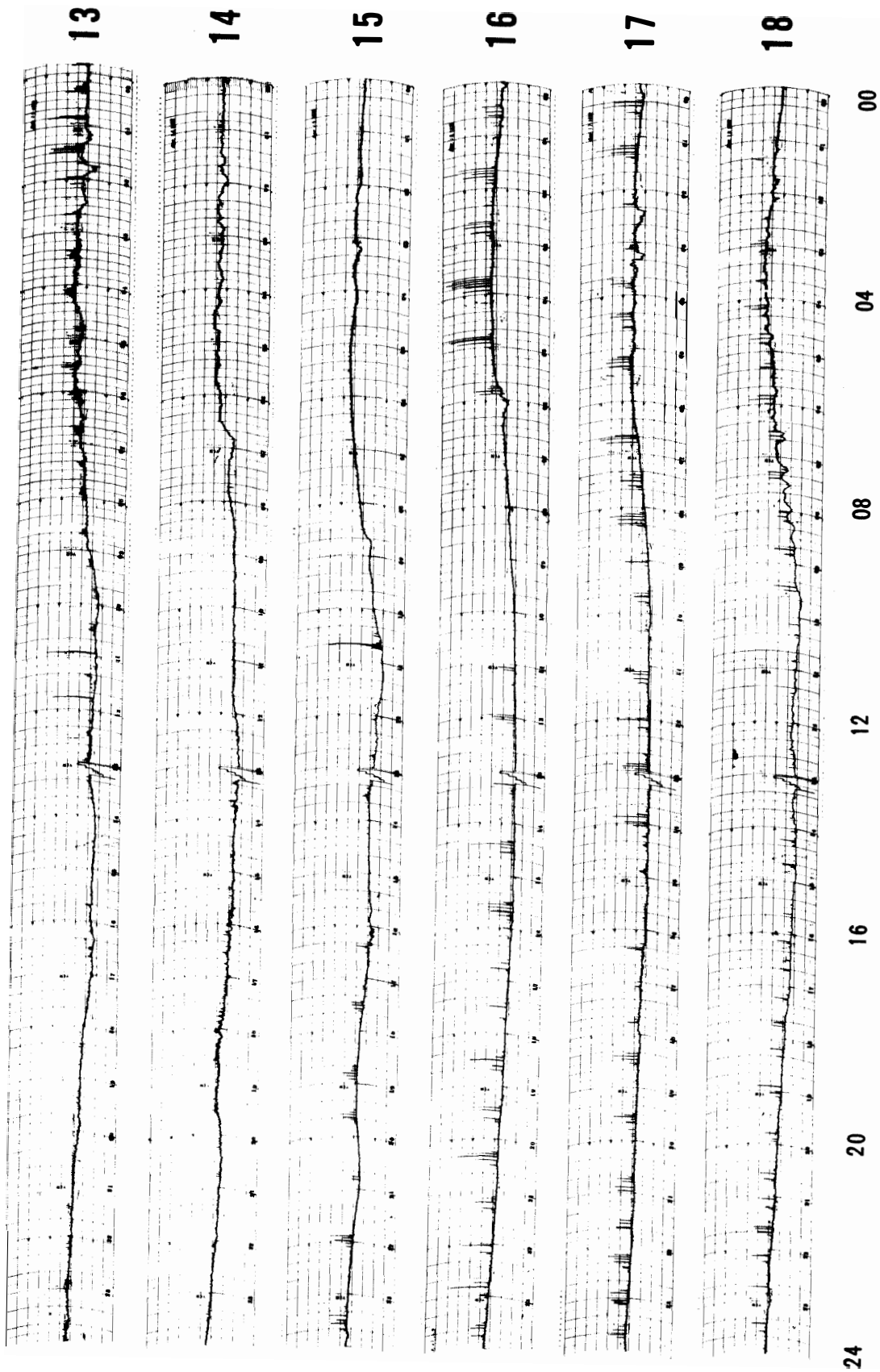


30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



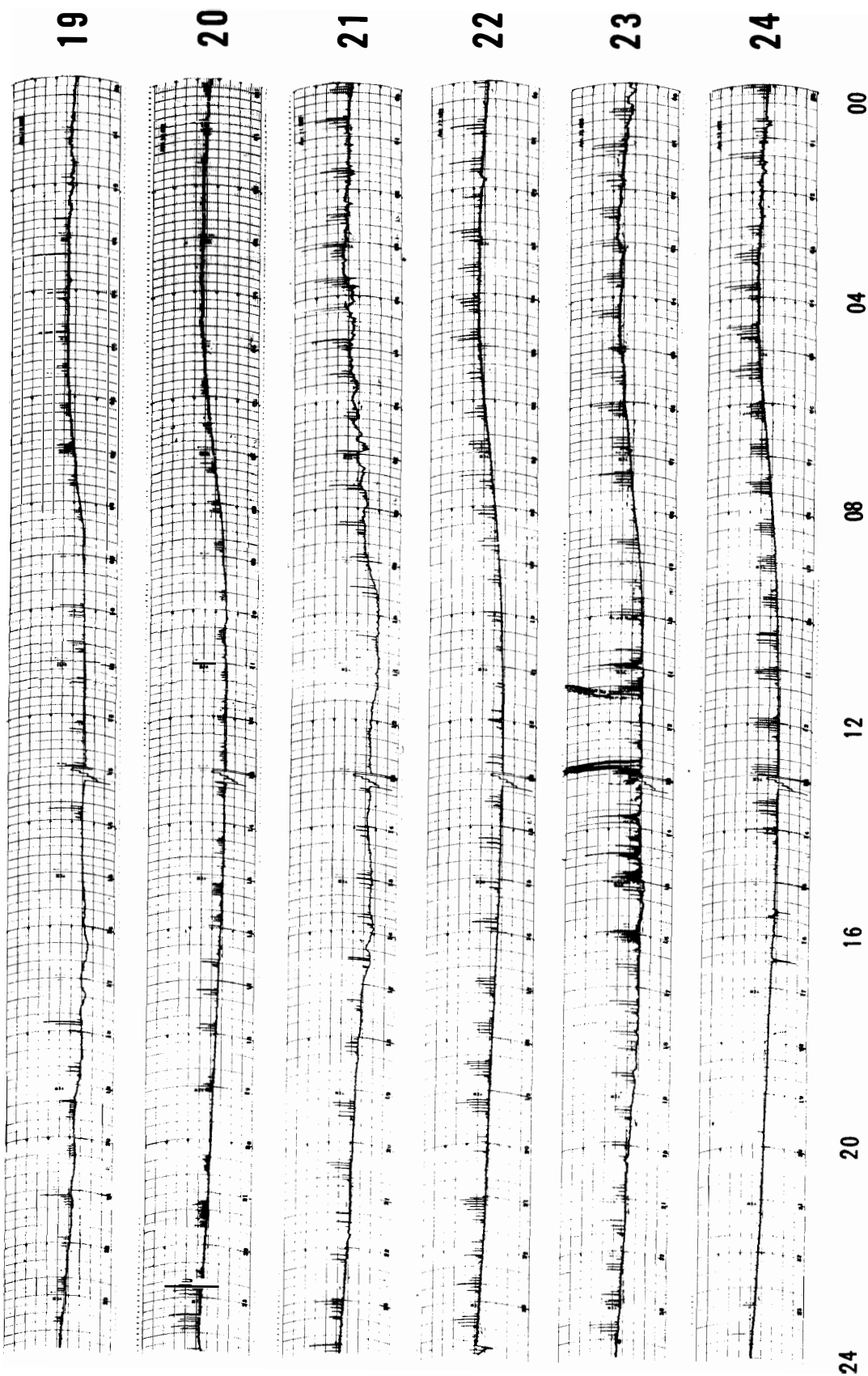
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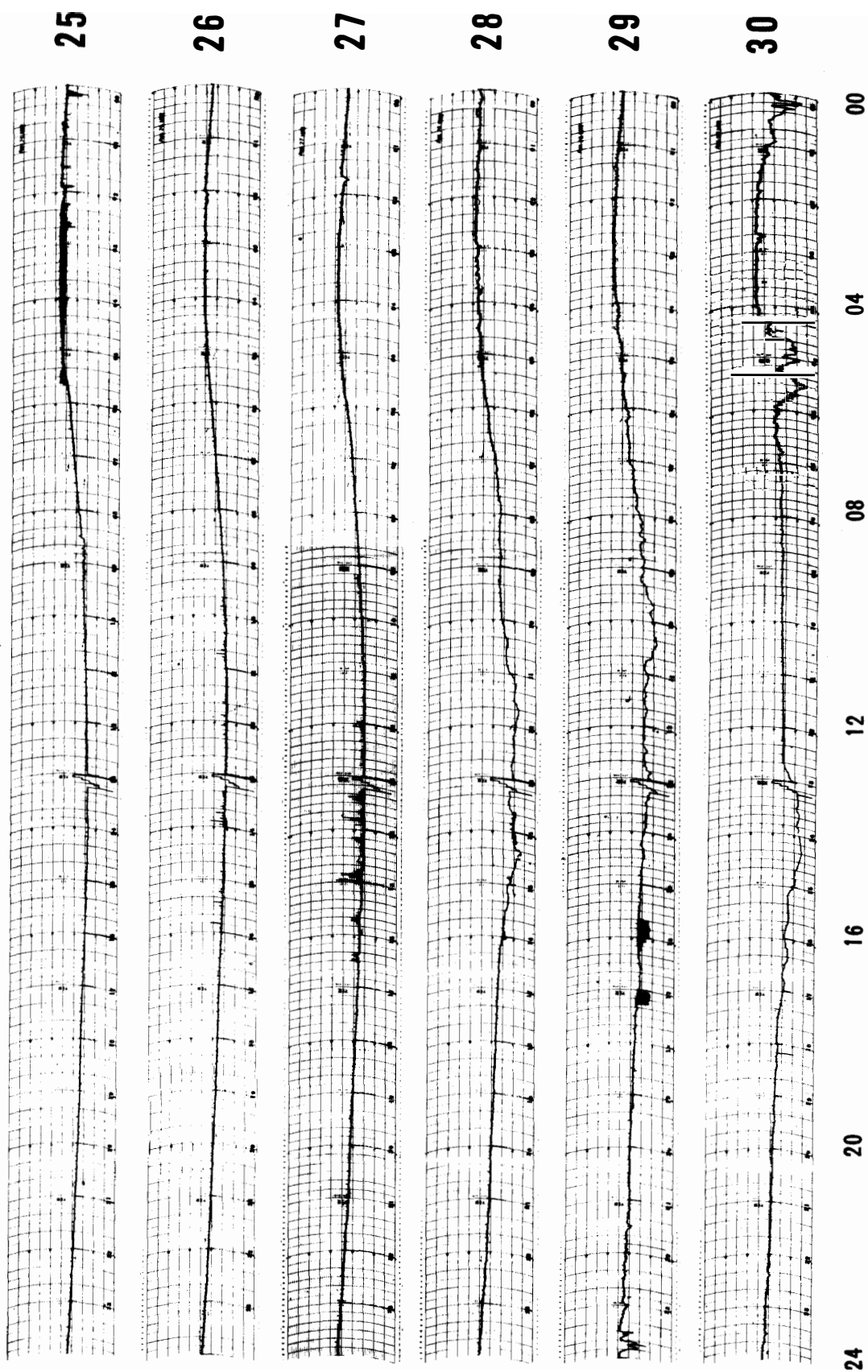
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45° EAST MERIDIAN TIME IN HOURS

APR 1972



APR 1972



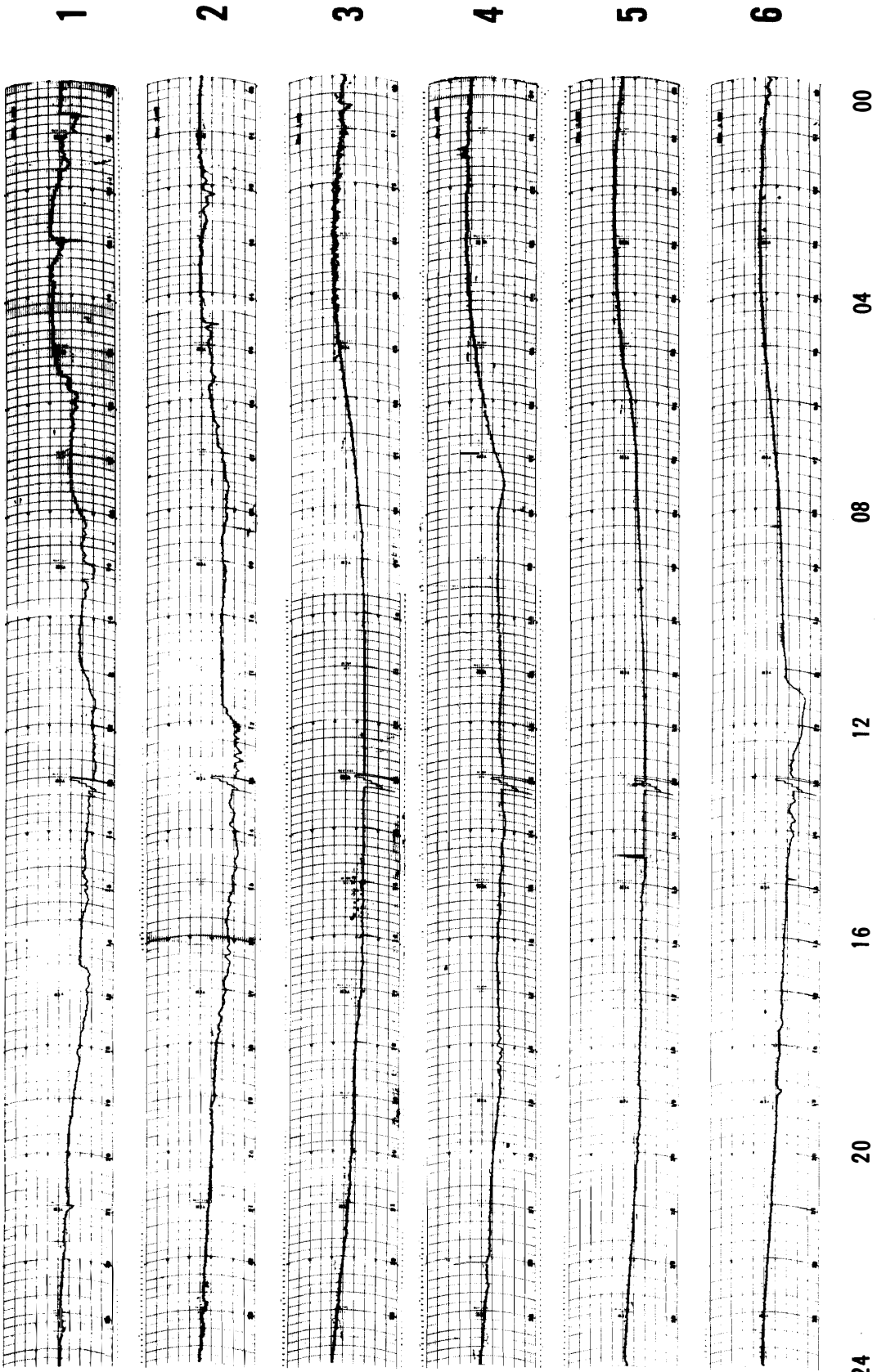
30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

Cosmic noise level obscured or equipment malfunction.

5th. 1000-1200 interferences.

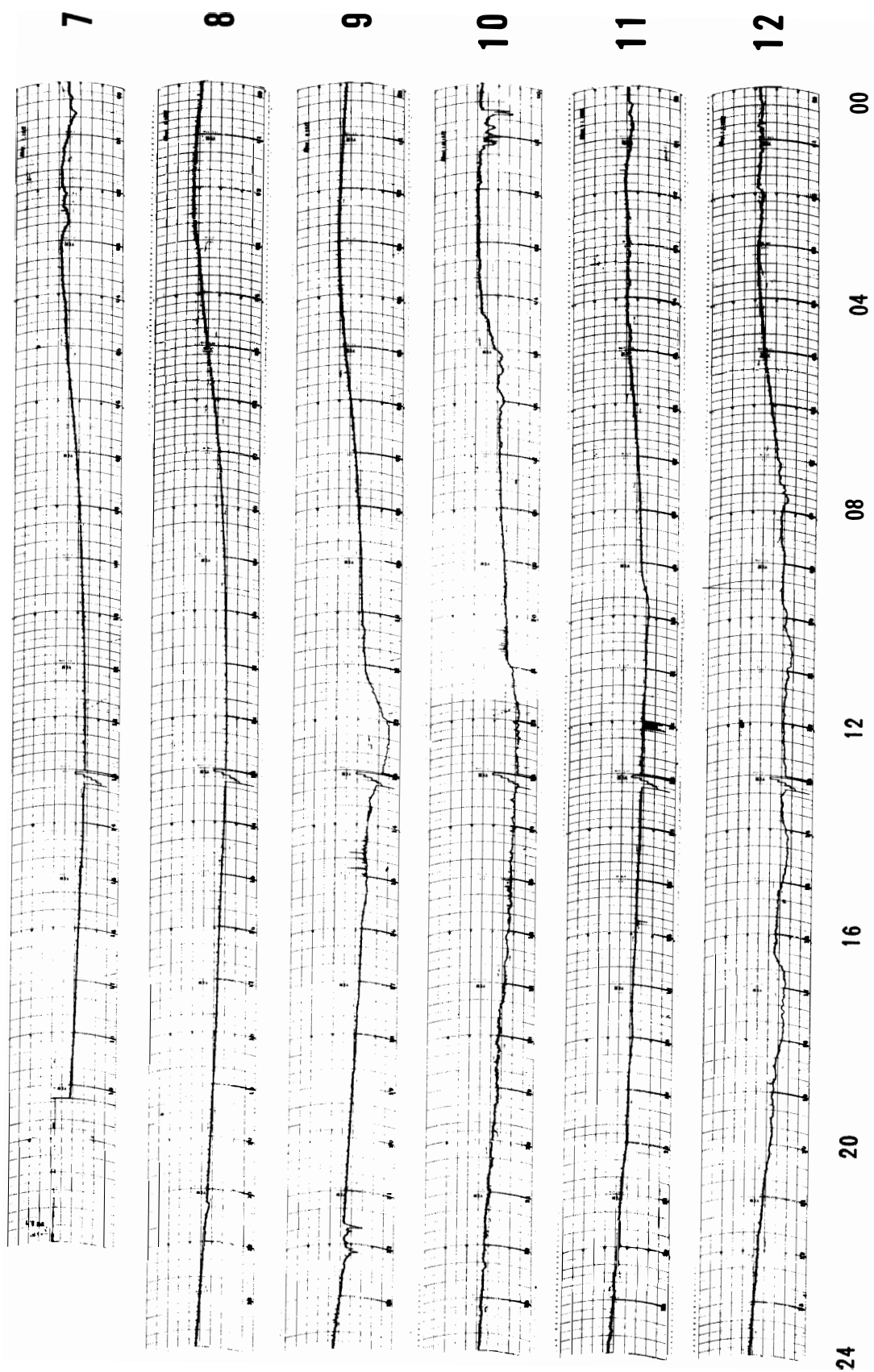
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

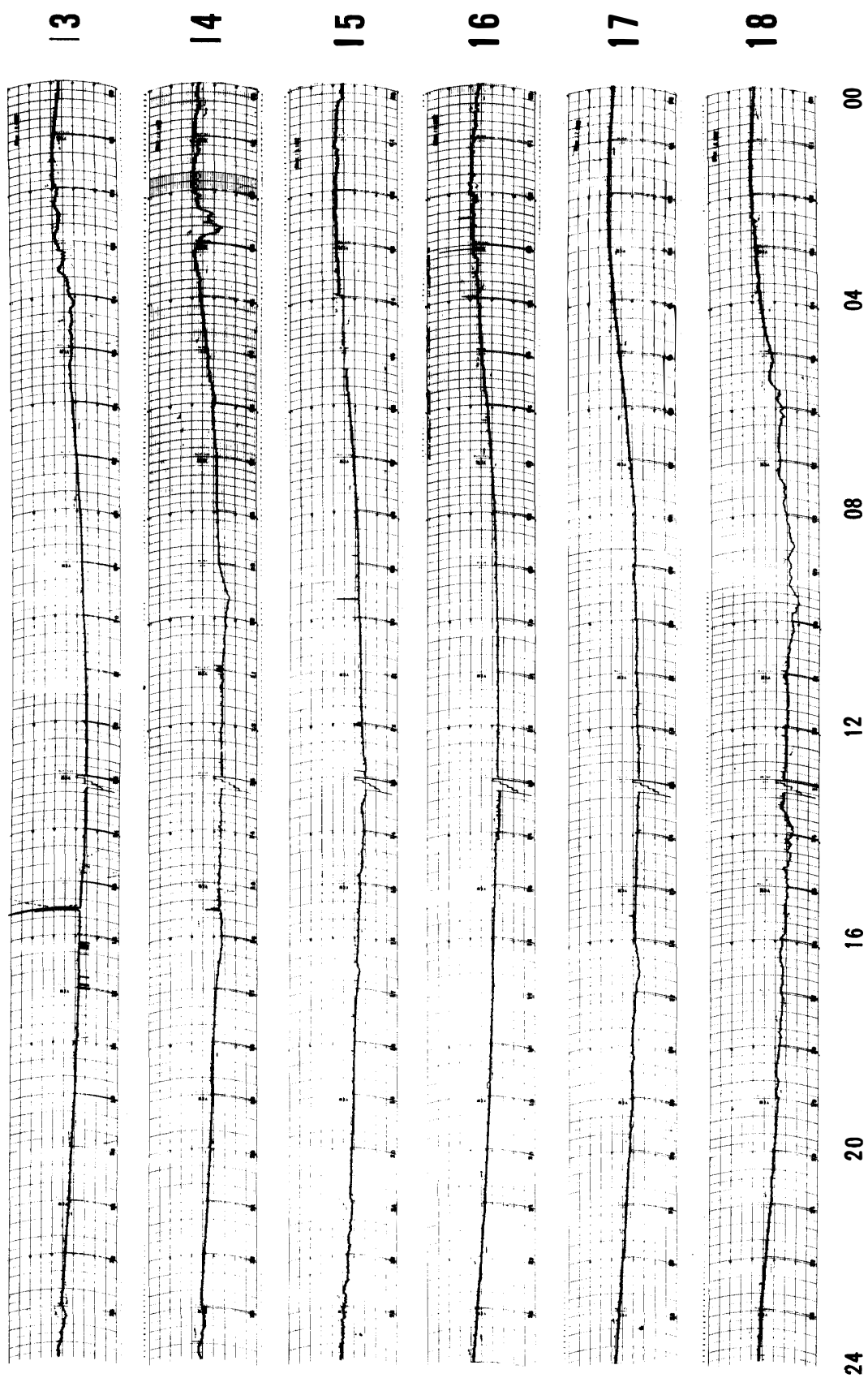
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

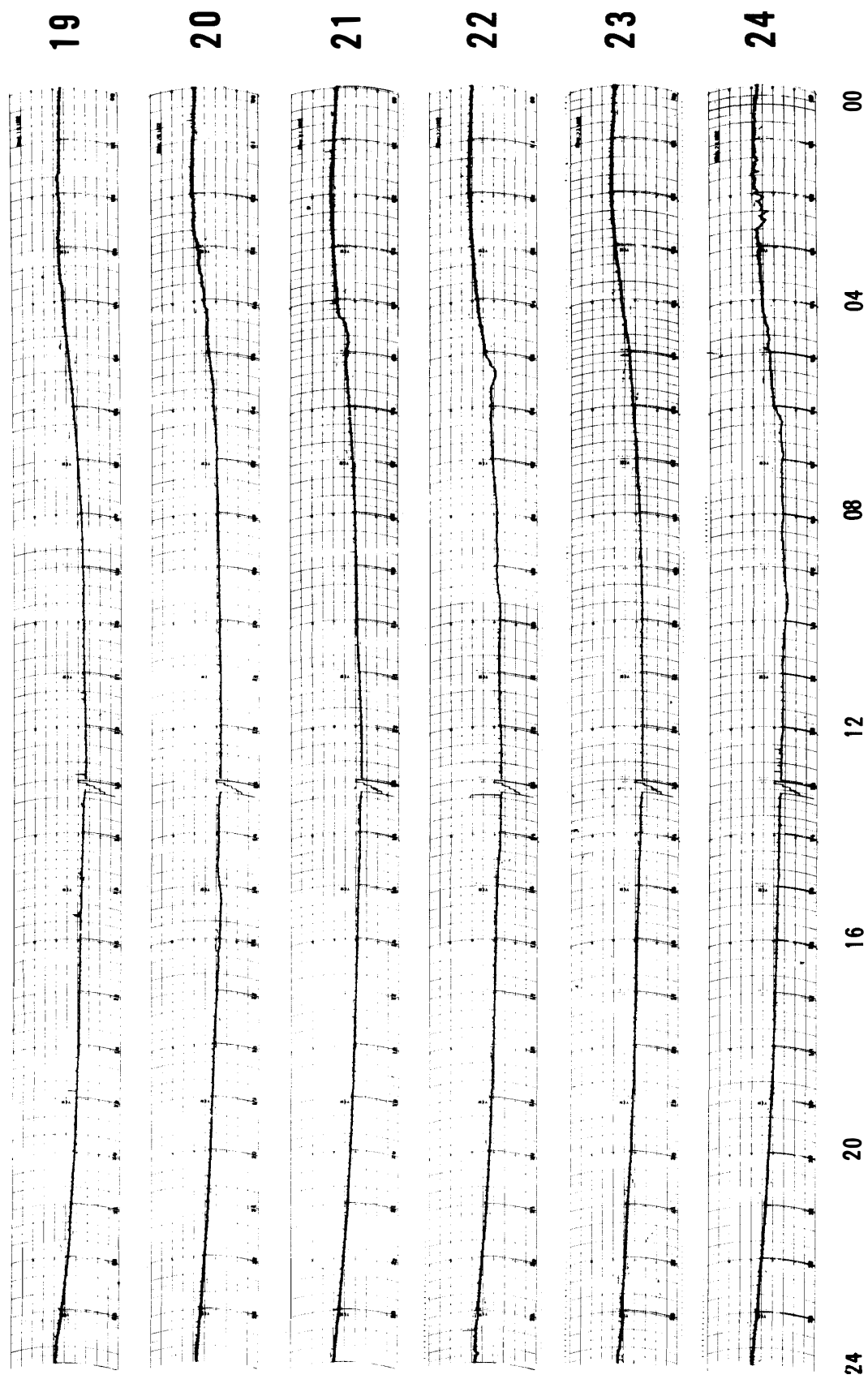
MAY 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

MAY 1972

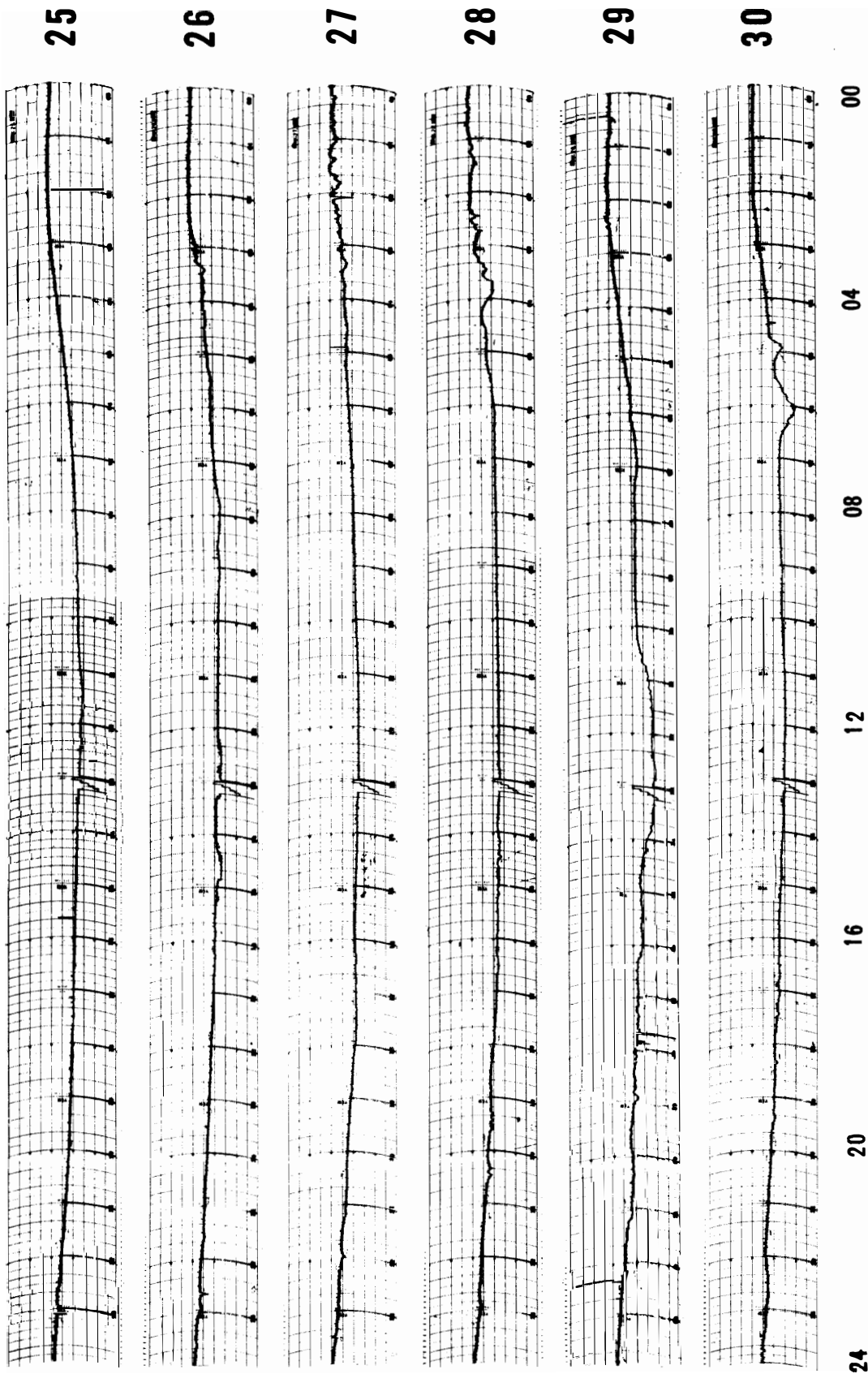


30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

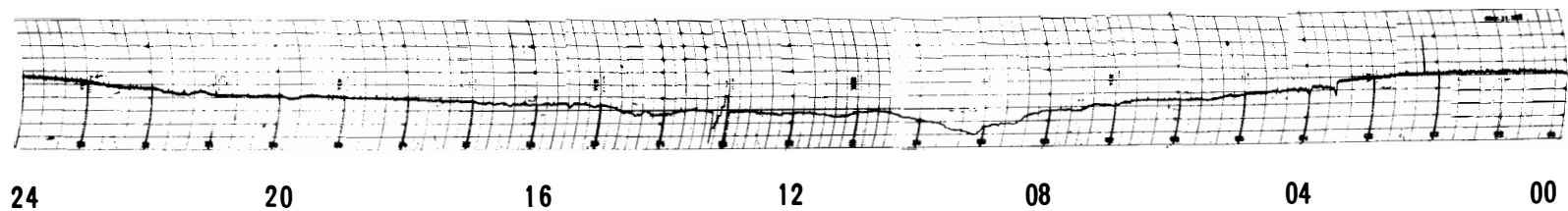


MAY 1972



30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



31

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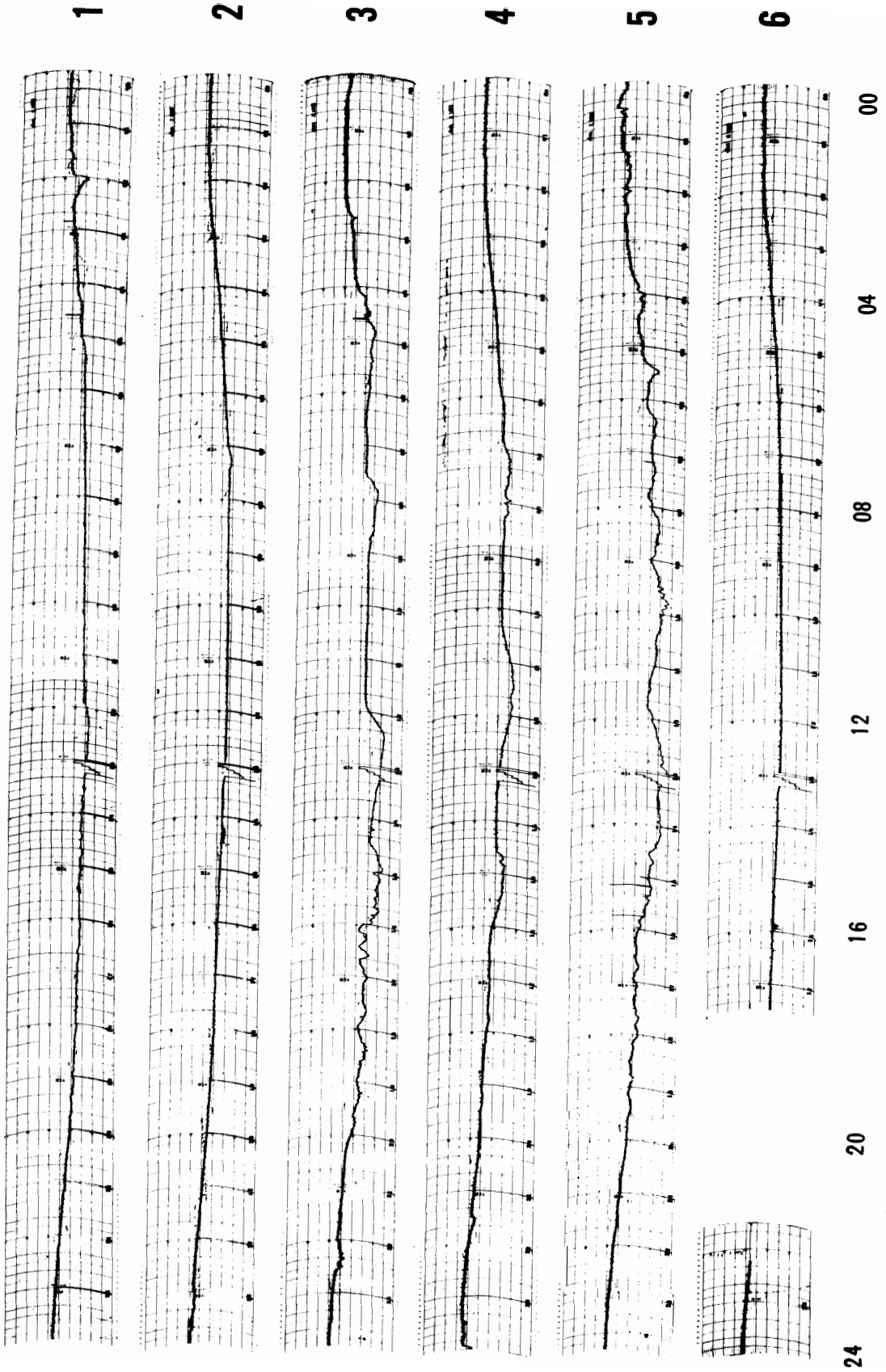
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30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

- 7th. 1915-2350 failure of equipment.
- 15th. 0400-0520 "

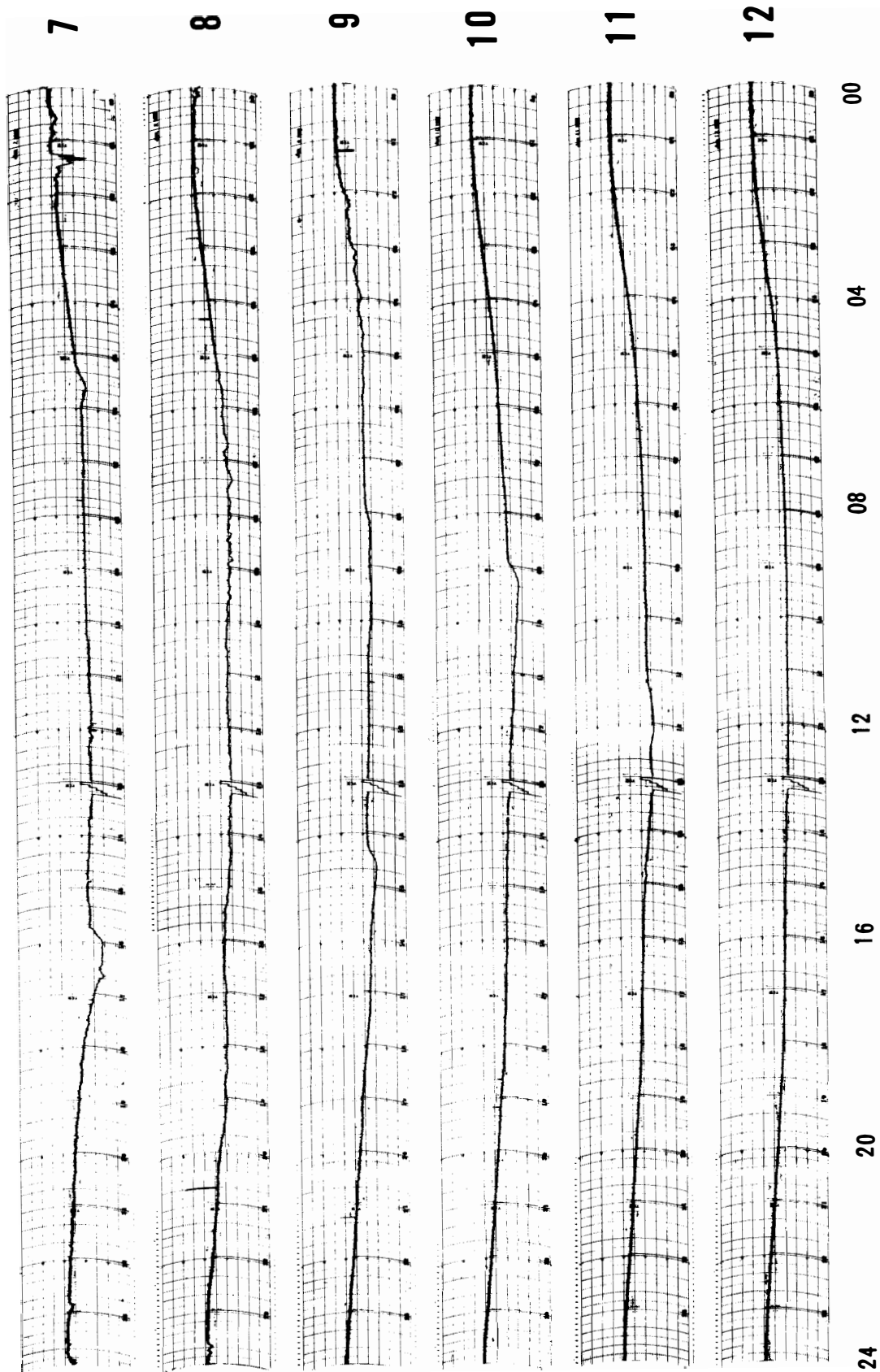
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

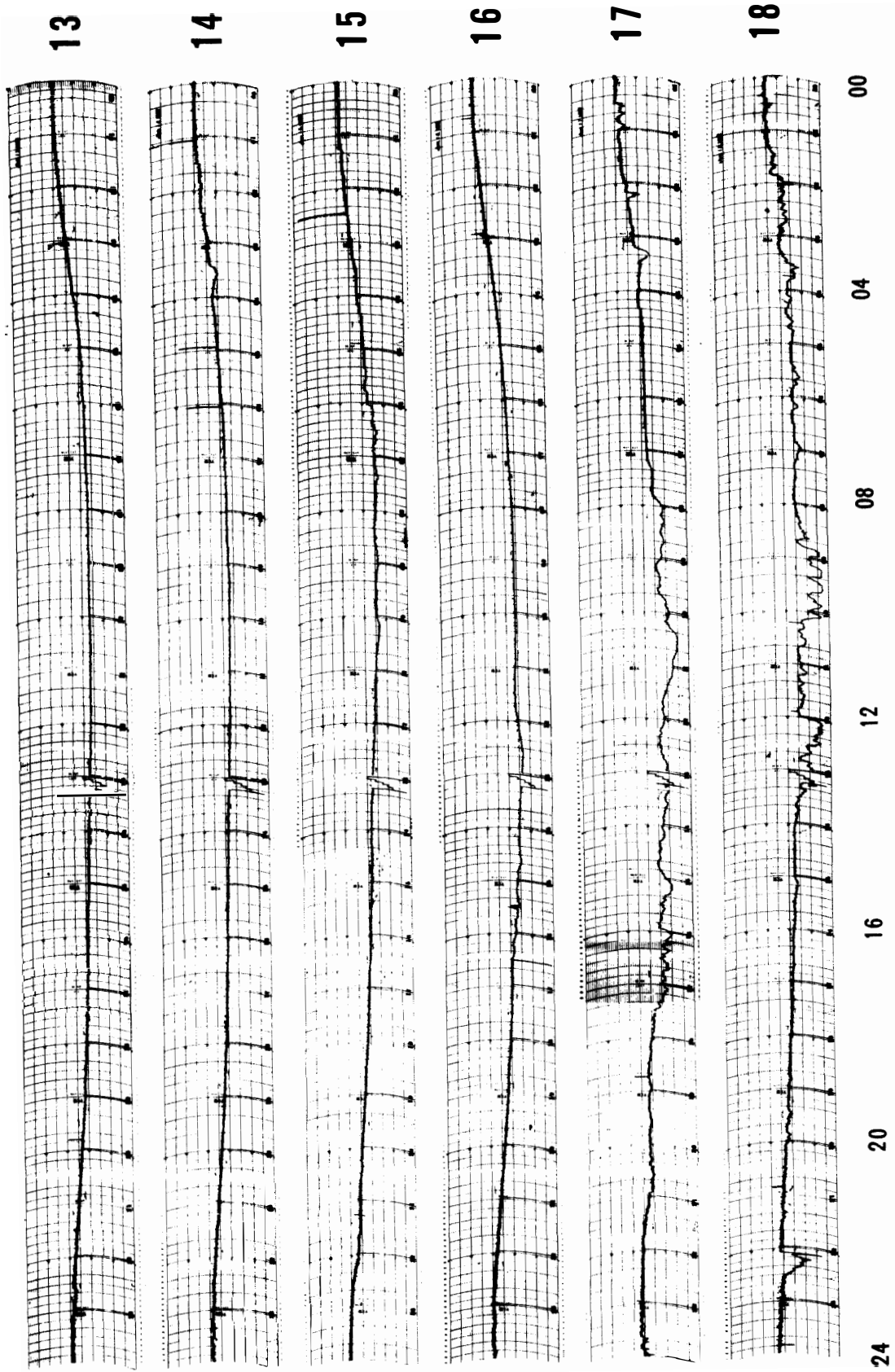
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

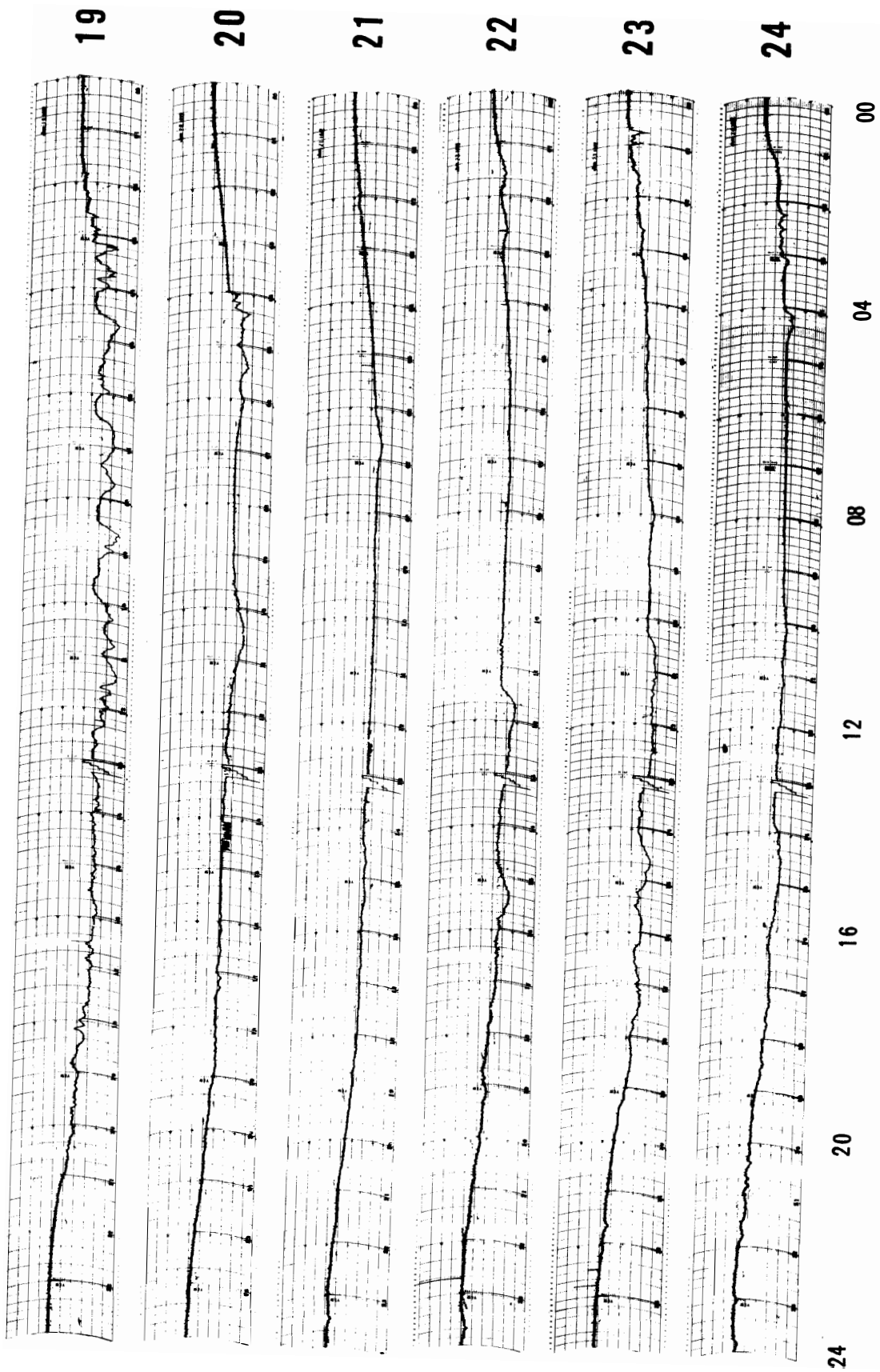
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30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

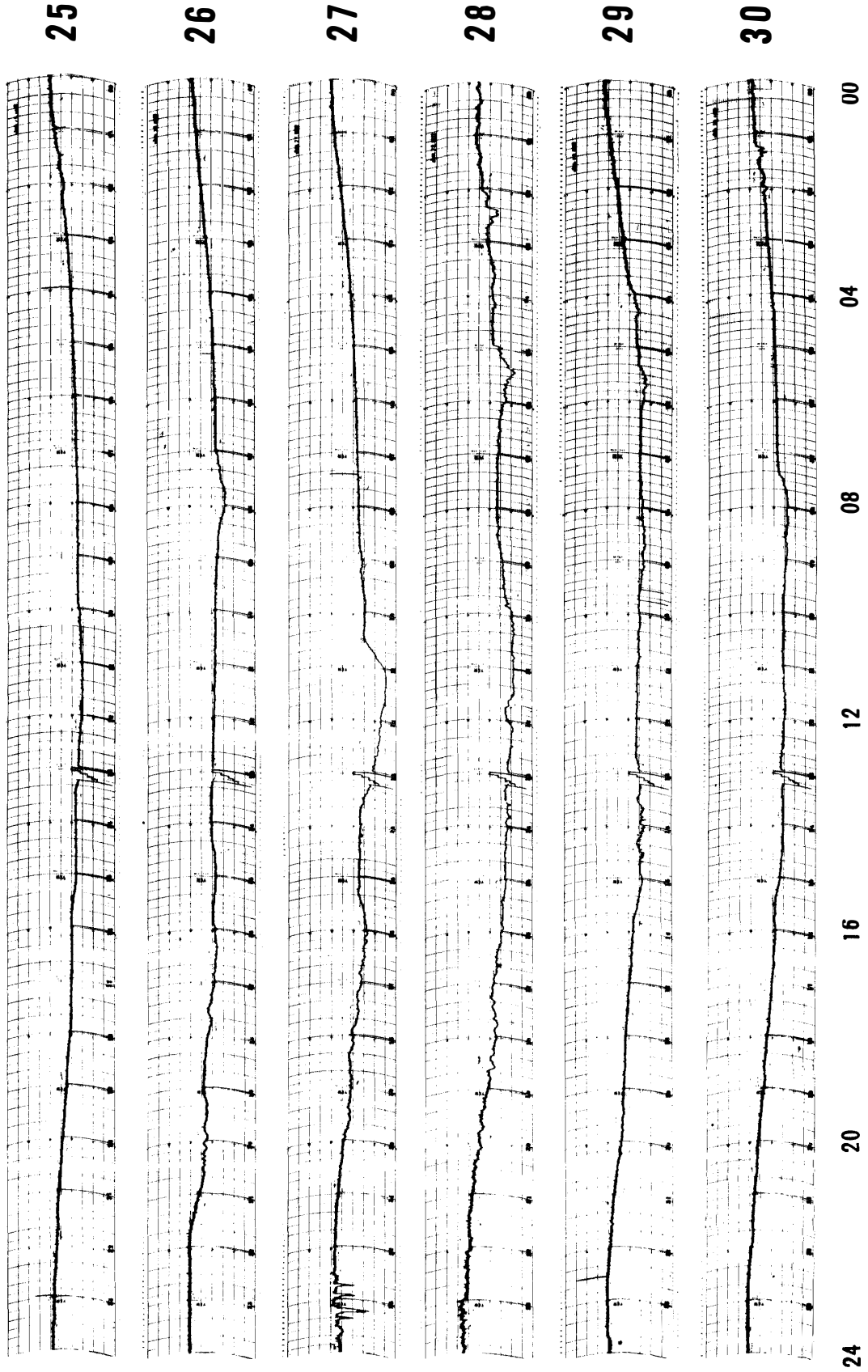
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

JUNE 1972



30MHz COSMIC NOISE

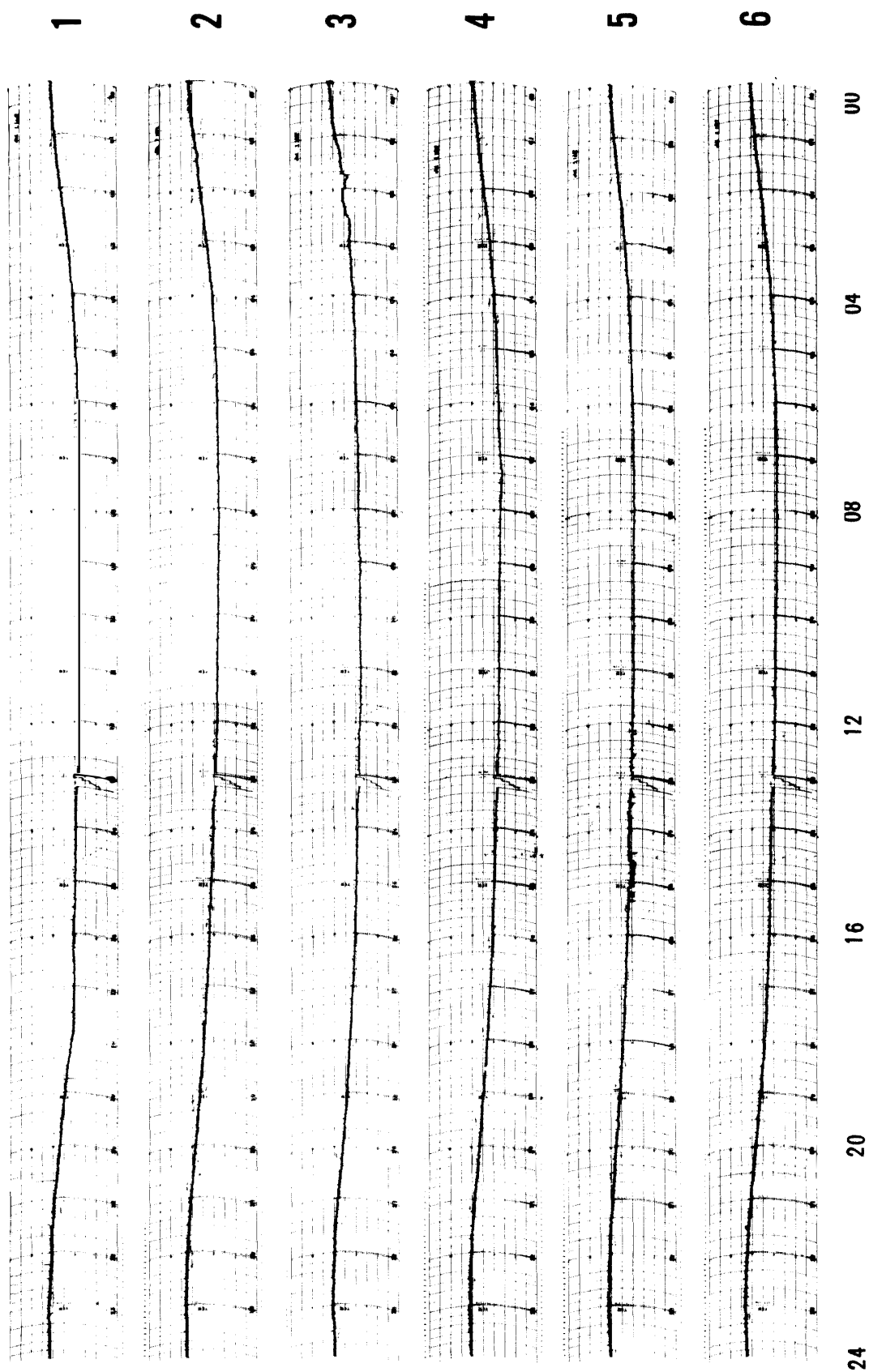
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Cosmic noise level obscured or equipment malfunction.

6th. 1730-2220 failure of equipment.



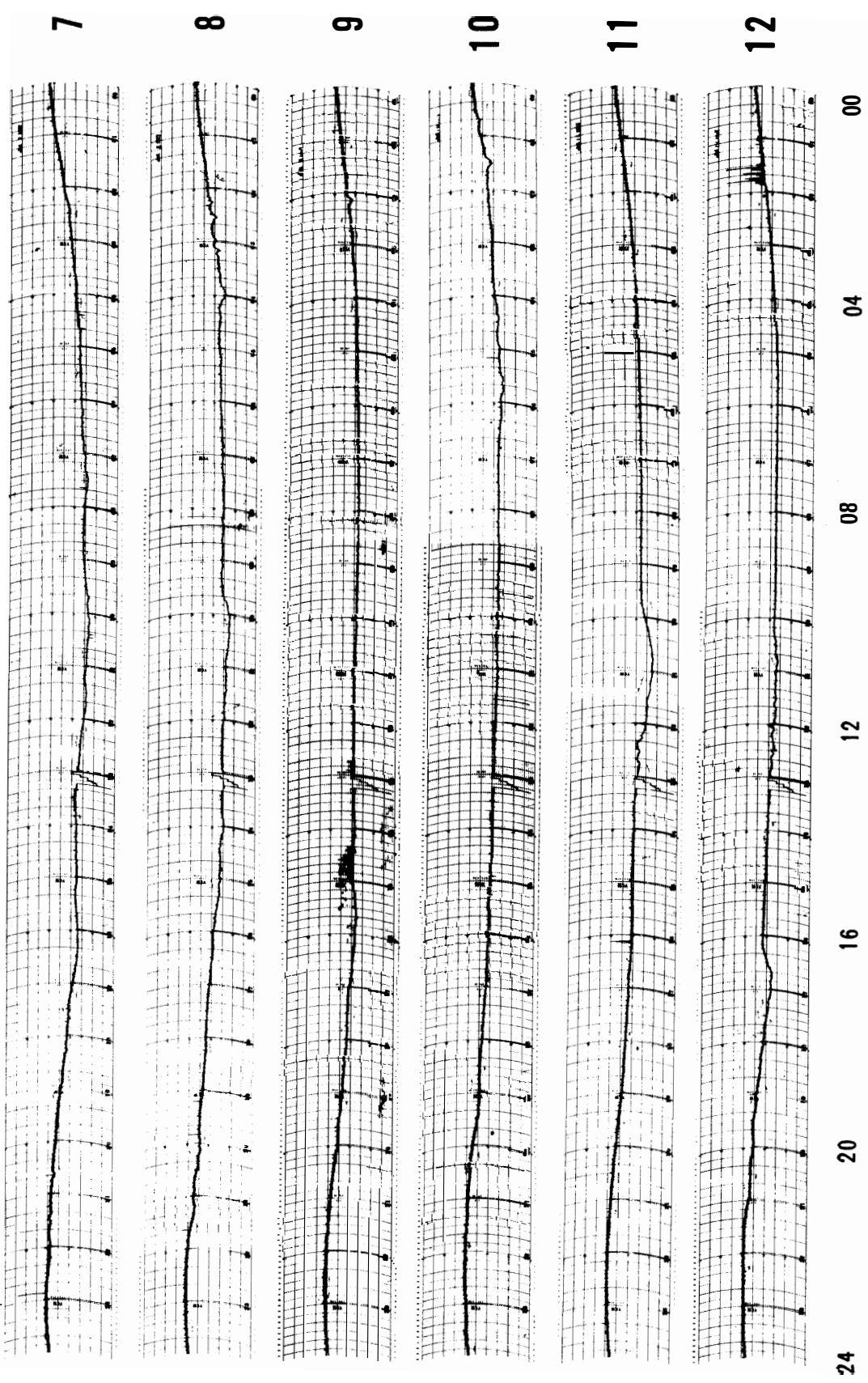
JULY 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

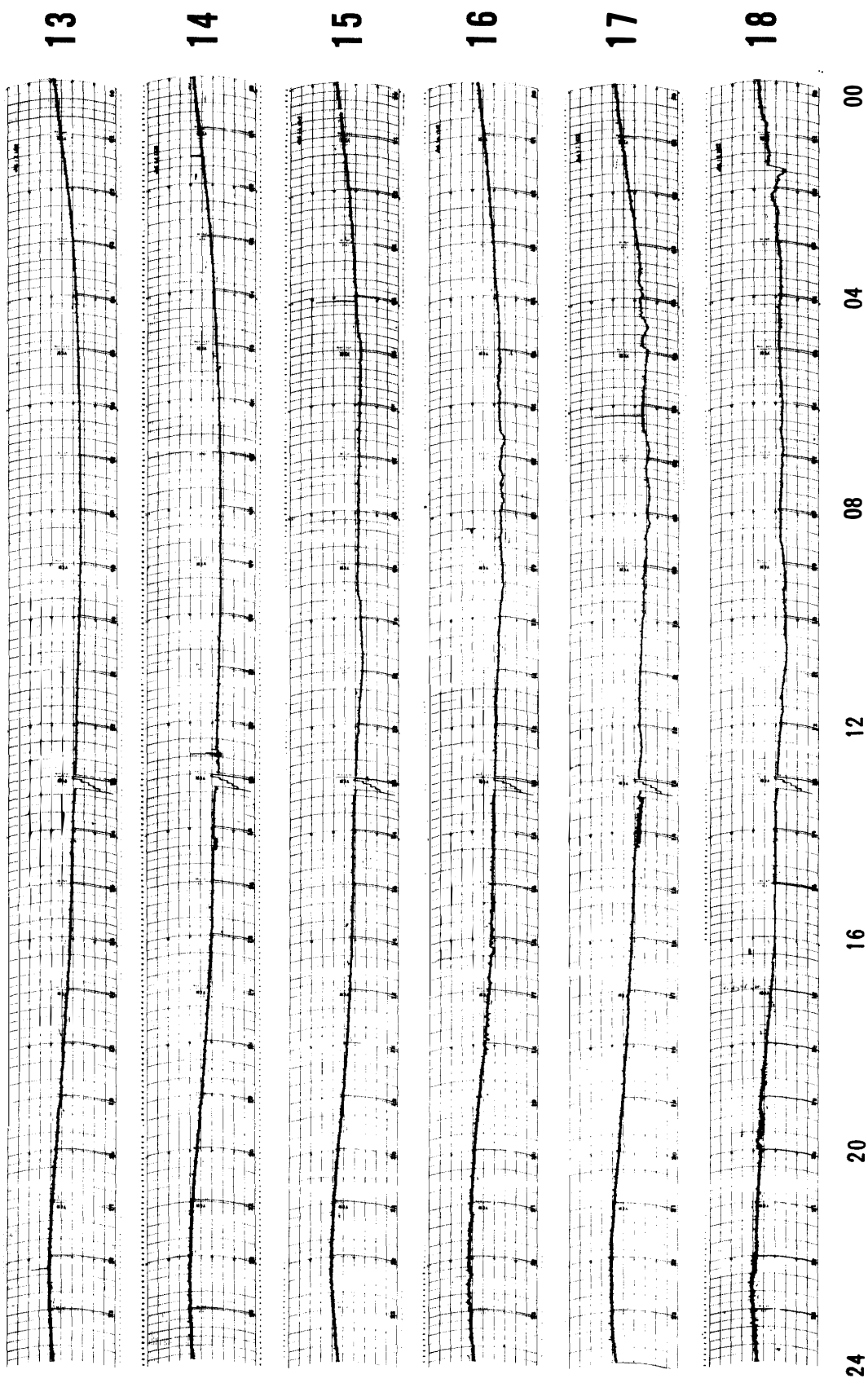
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

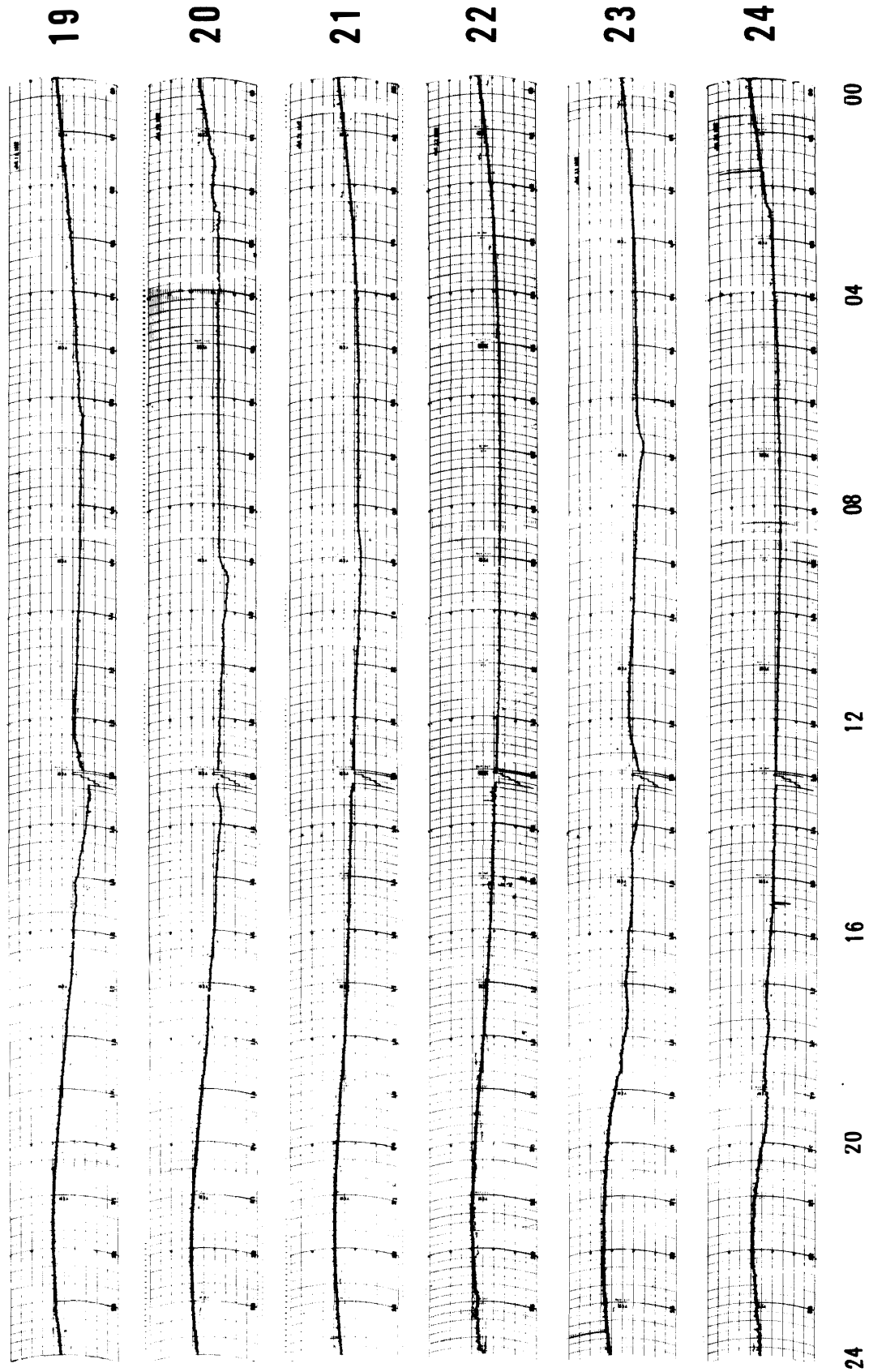
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

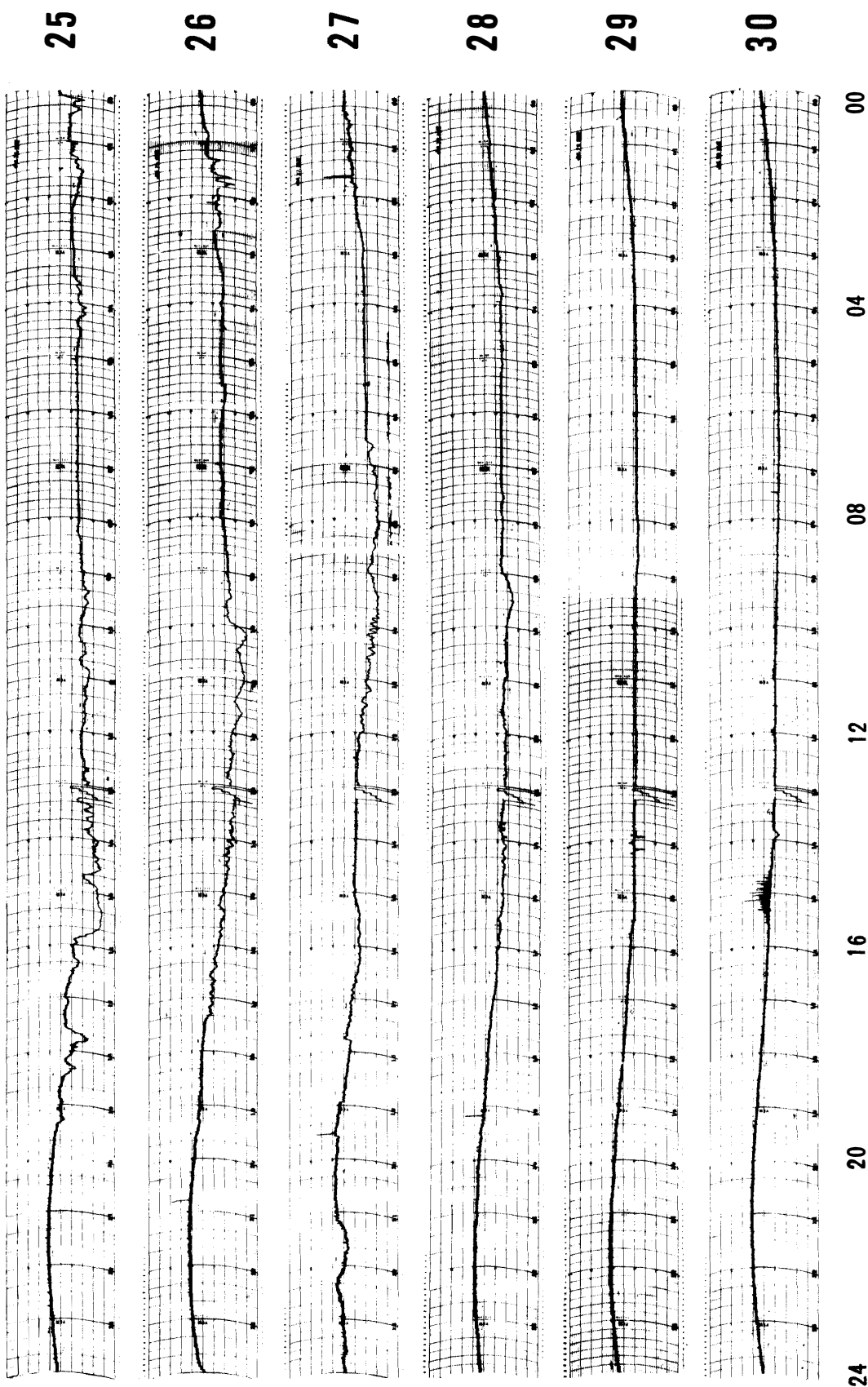
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

JULY 1972

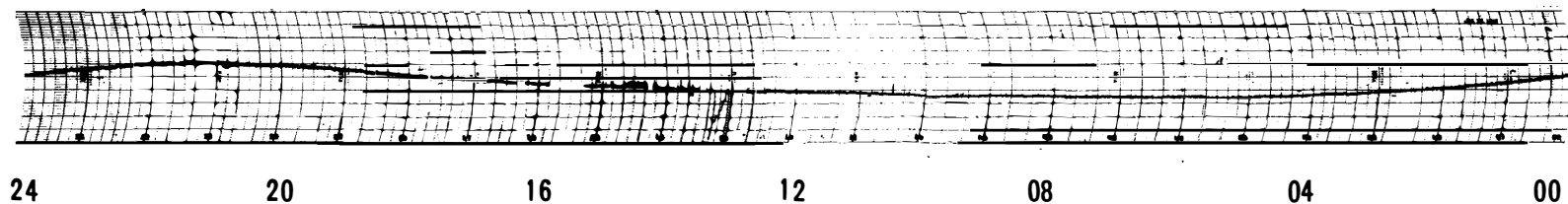


30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

JULY 1972

31



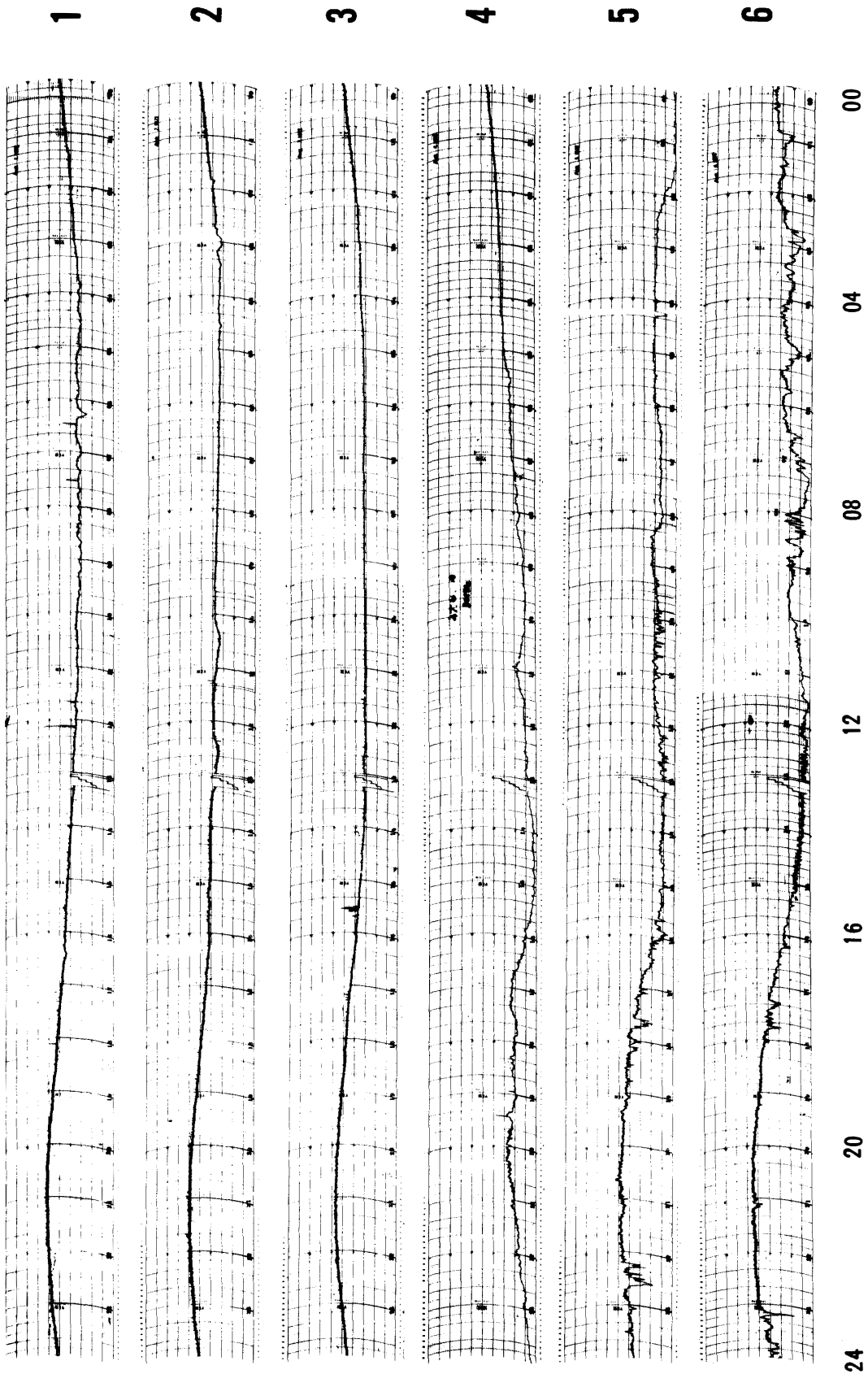
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

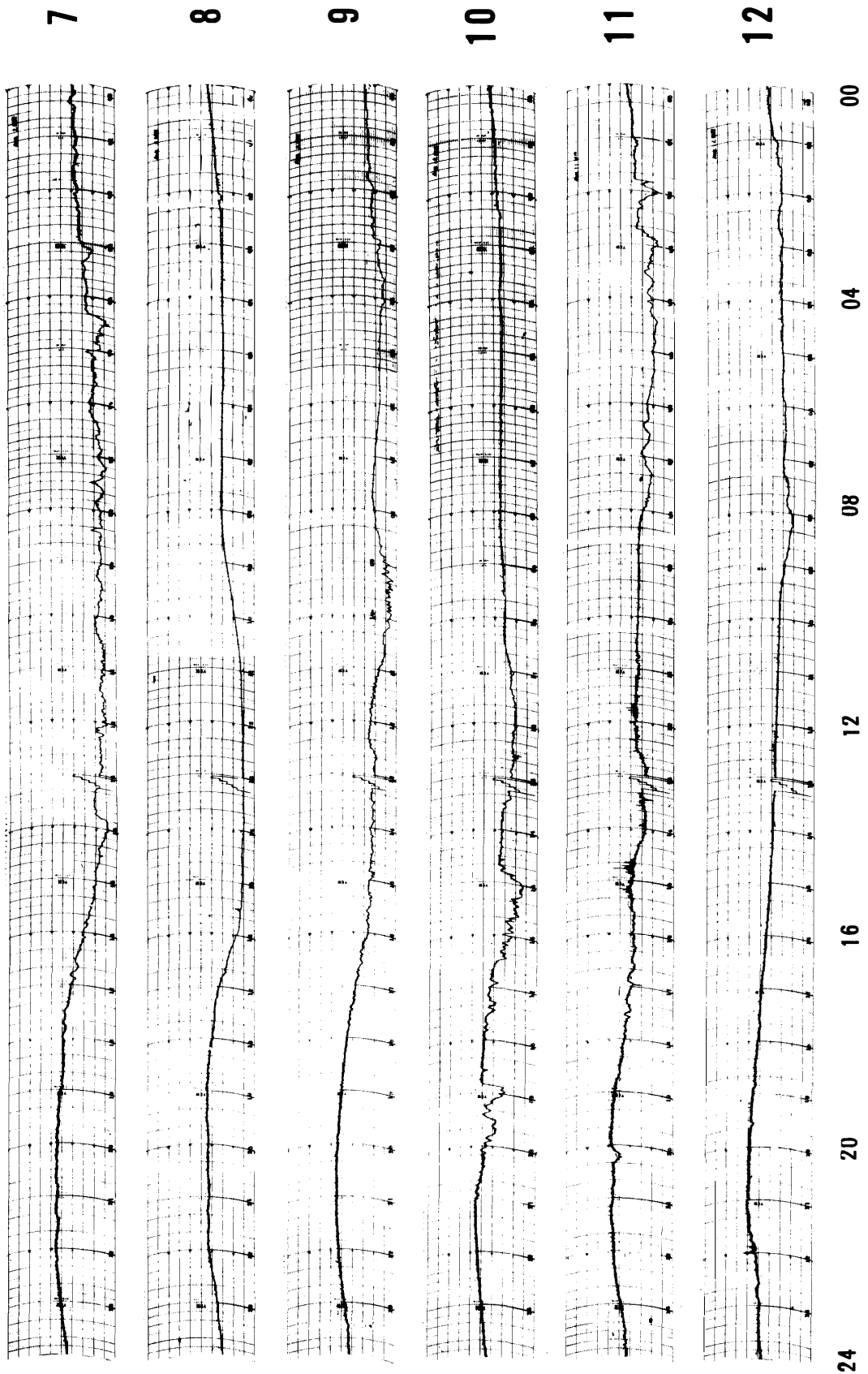
Cosmic noise level obscured or equipment malfunction.

18th. 1500-1630 failure of equipment.

AUG 1972



AUG 1972

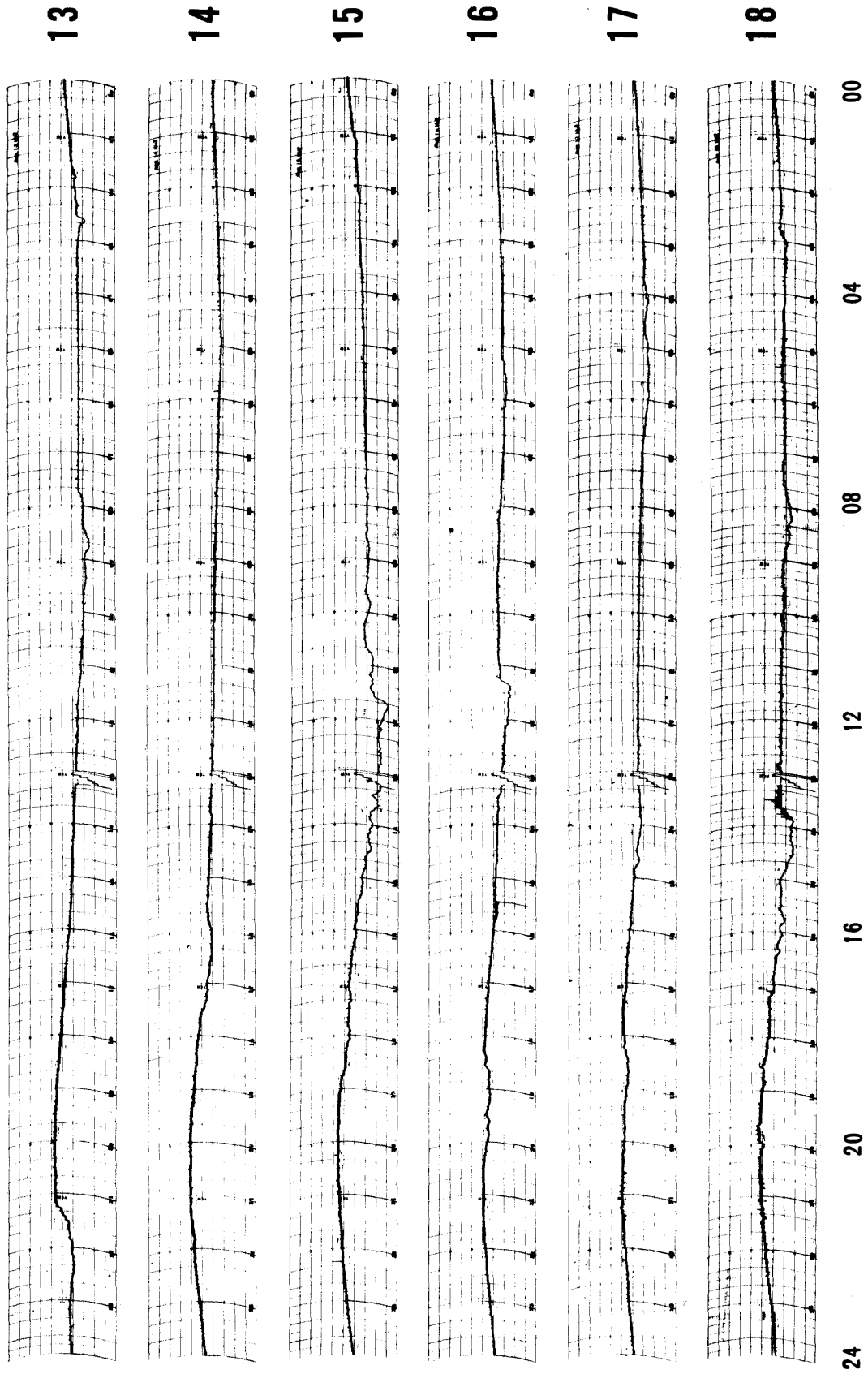


30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



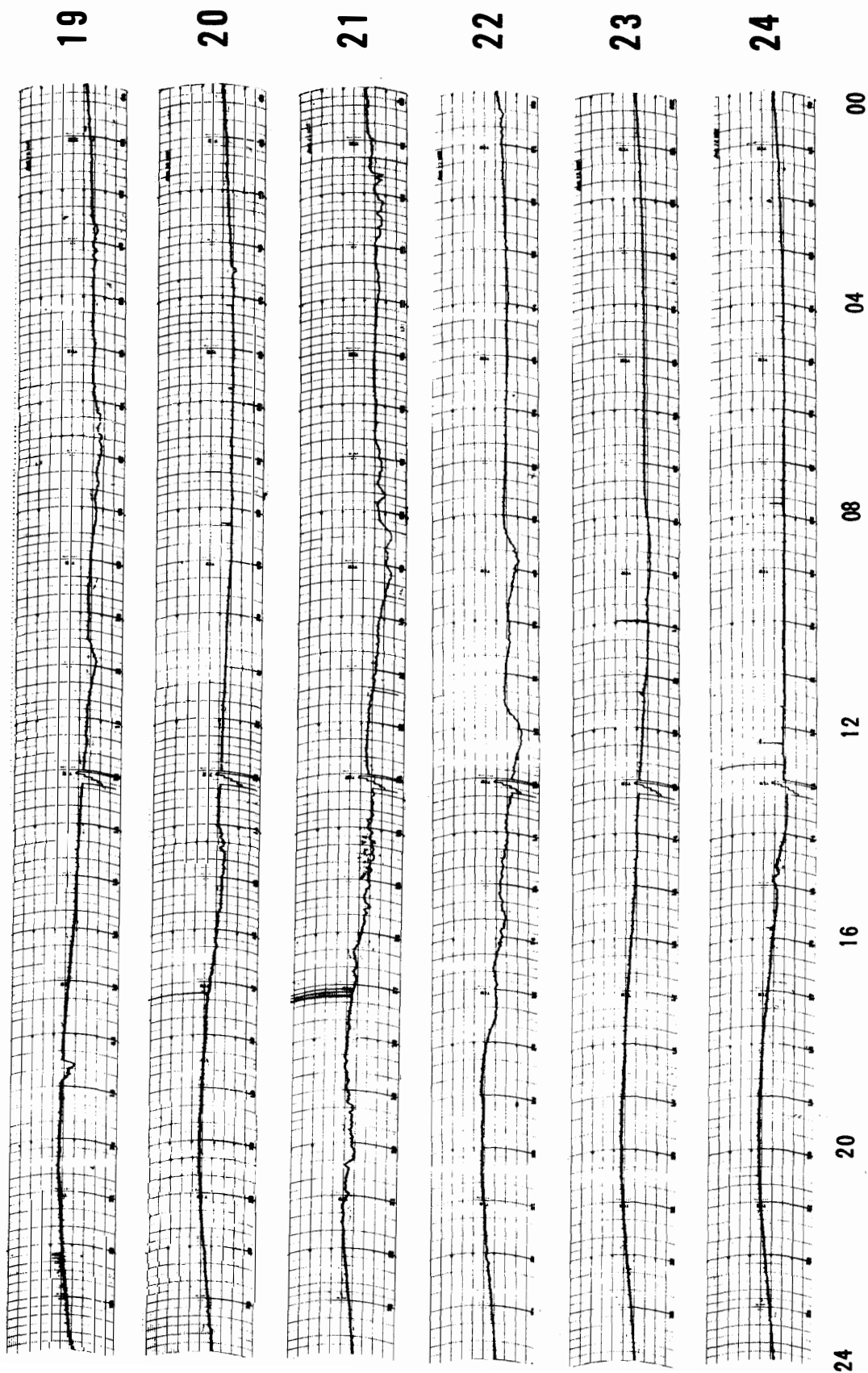
AUG 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

AUG 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

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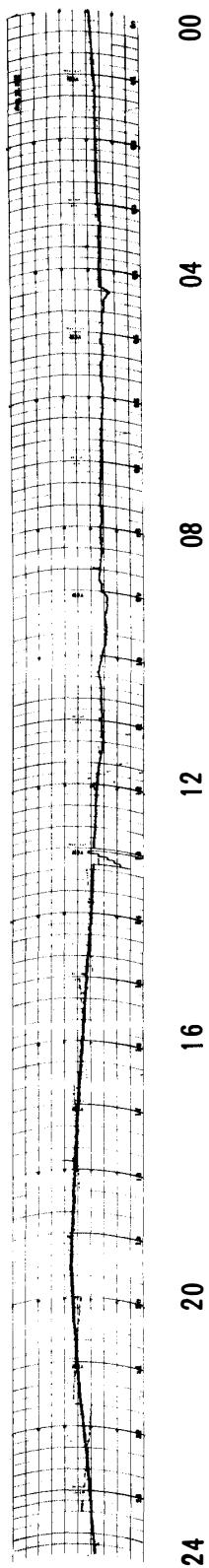


30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

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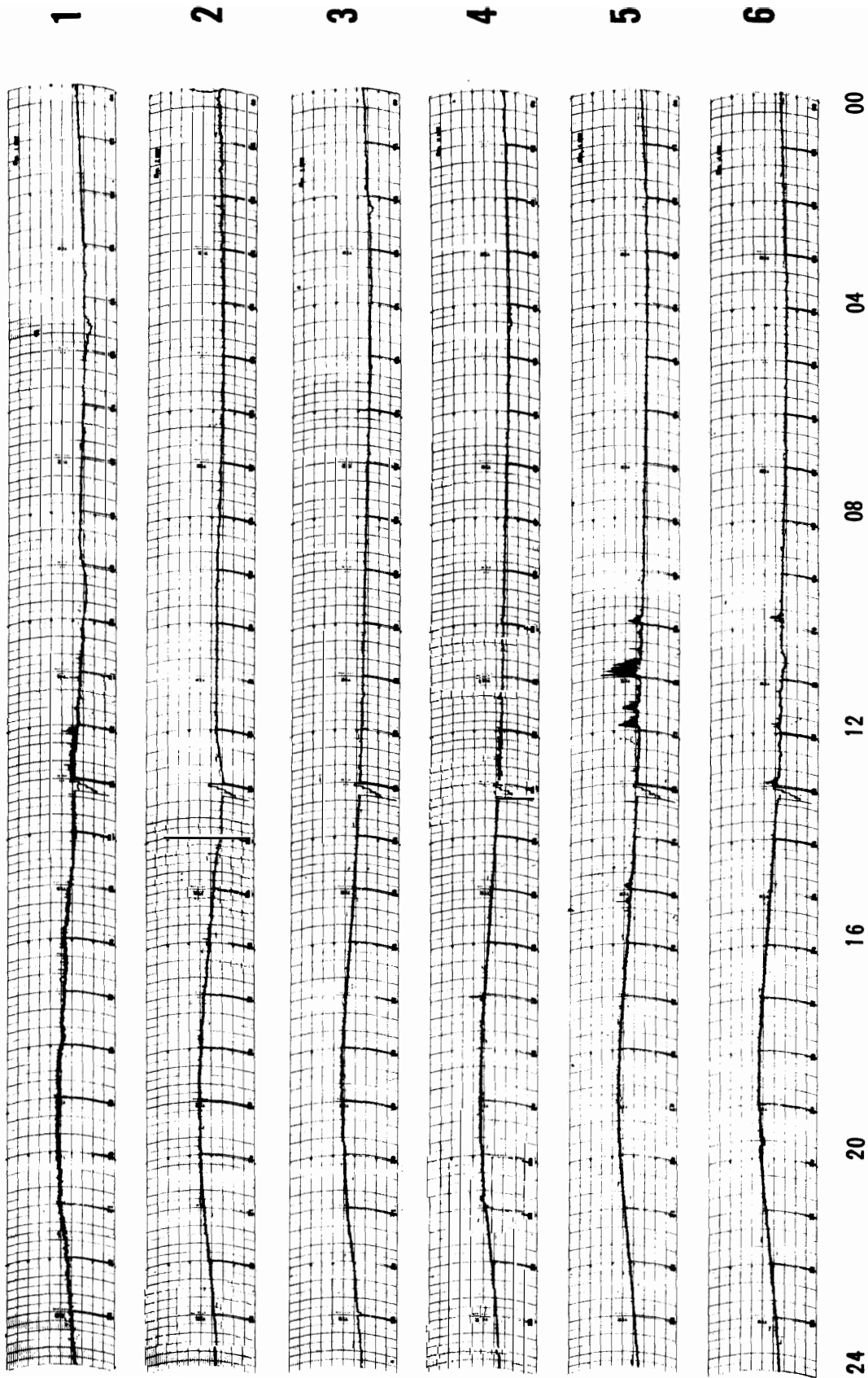
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30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

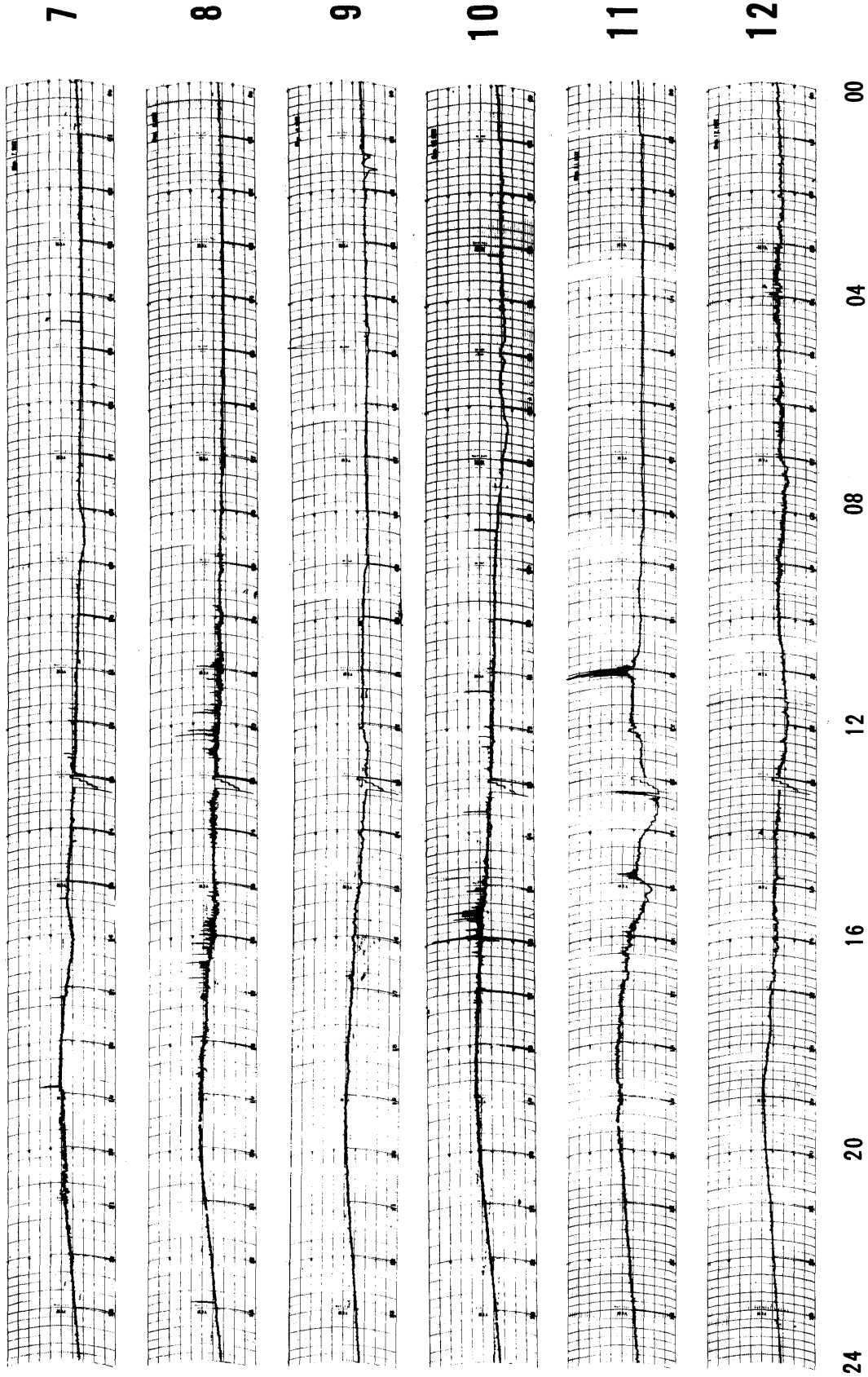
SEP 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

SEP 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

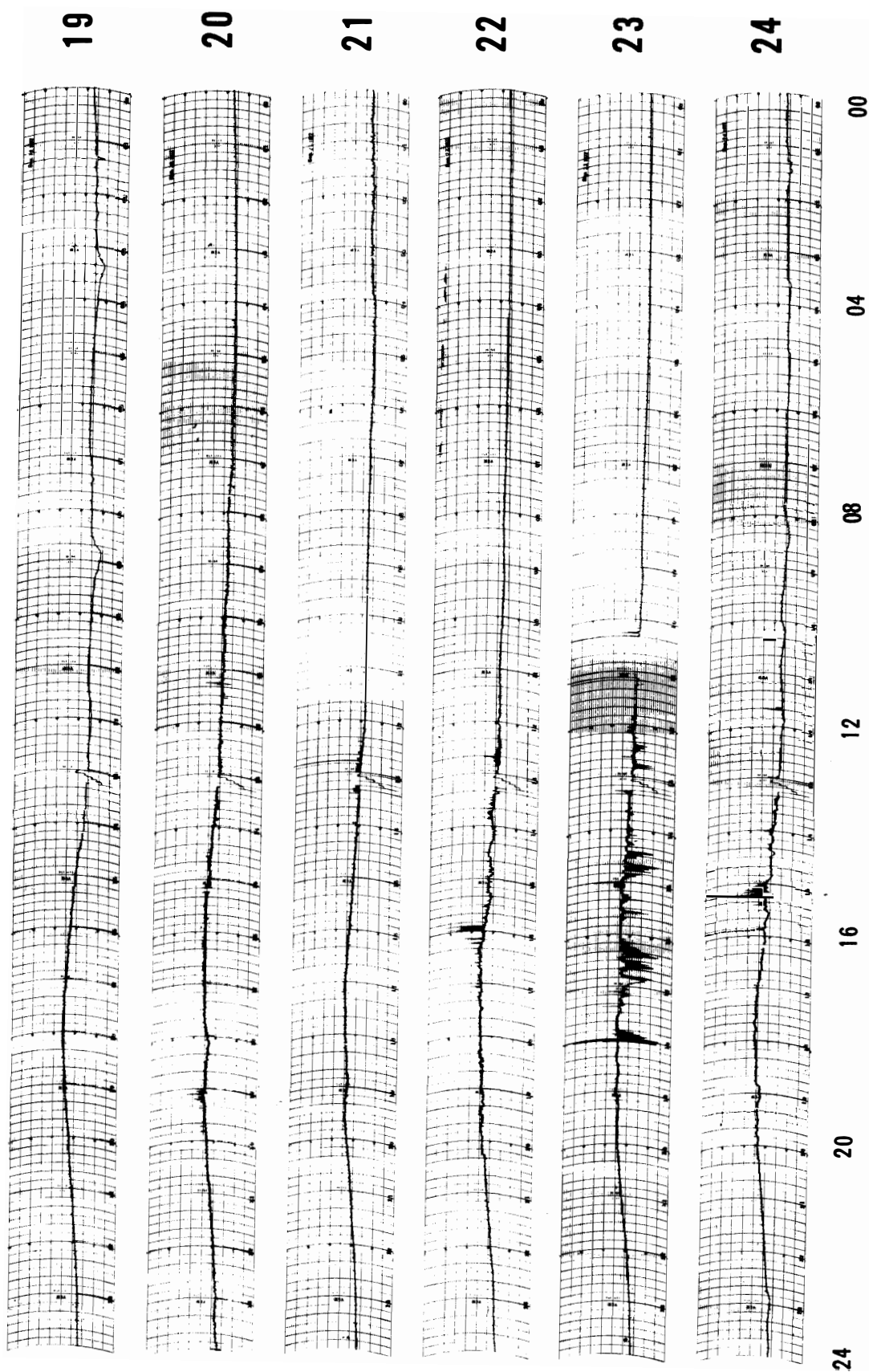
SEP 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

SEP 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



SEP 1972



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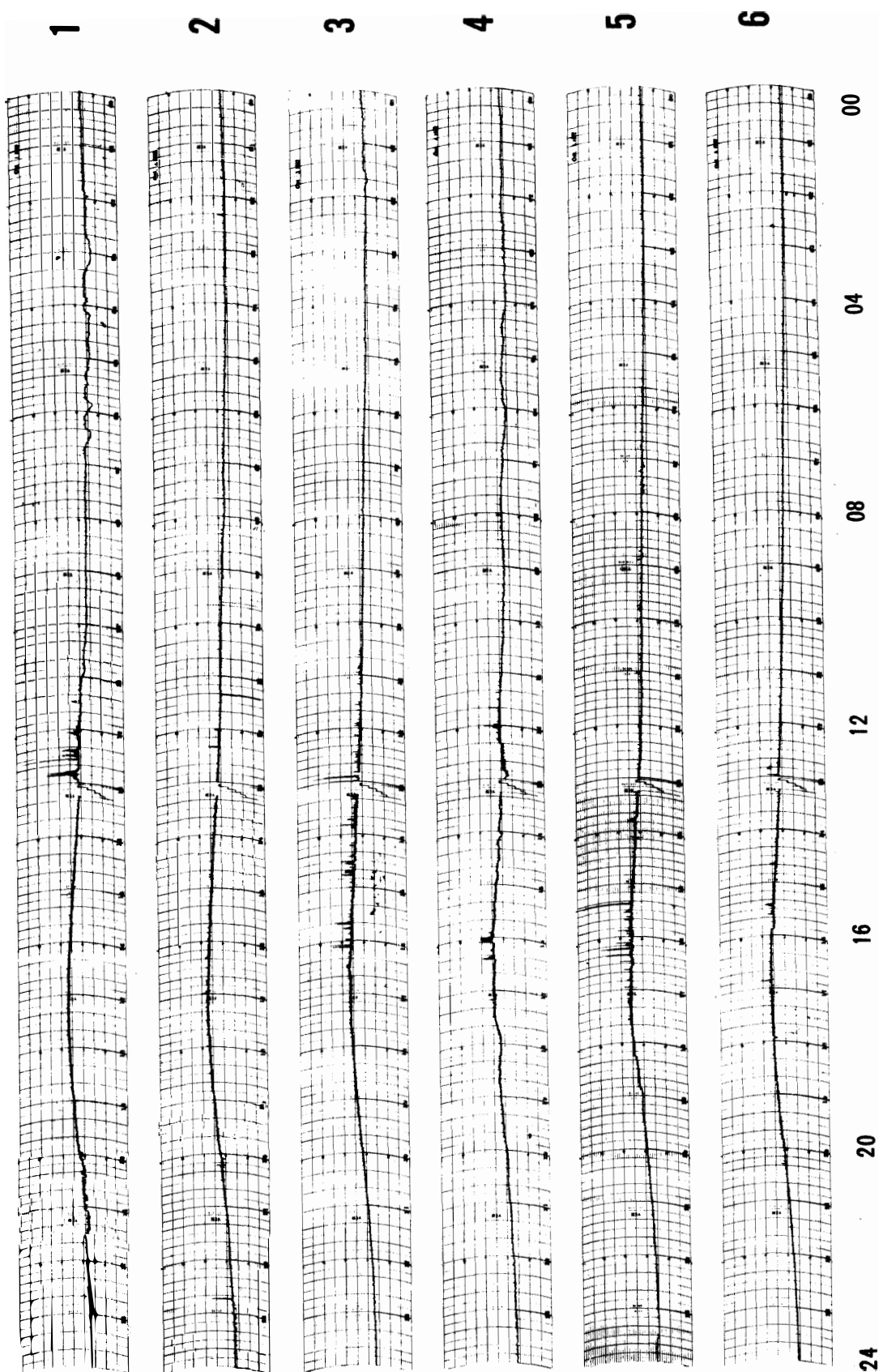
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

23rd. 1020-1107 interferences.  
26th. 1616-1617 equipment test.

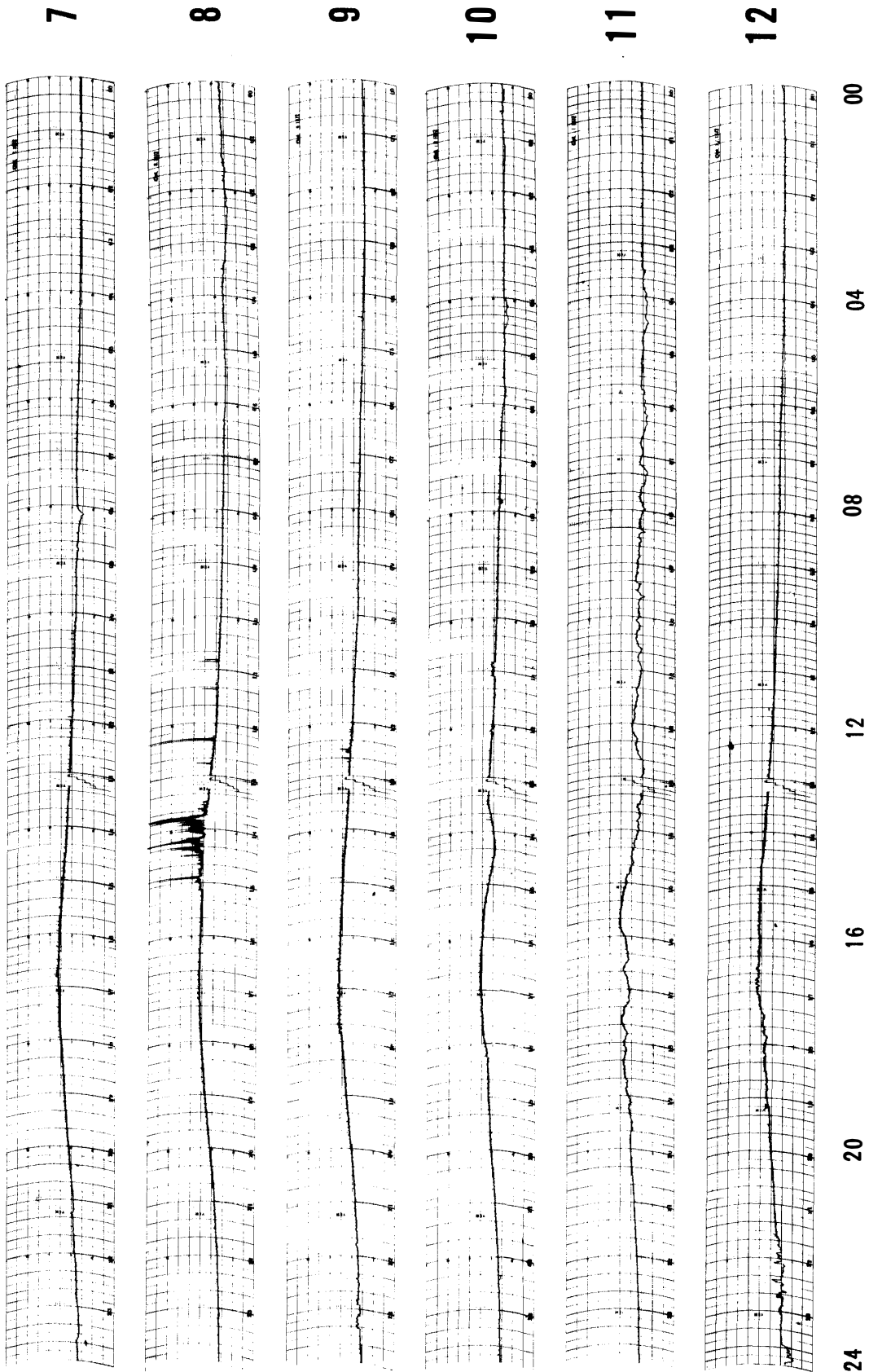
OCT 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

OCT 1972



30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

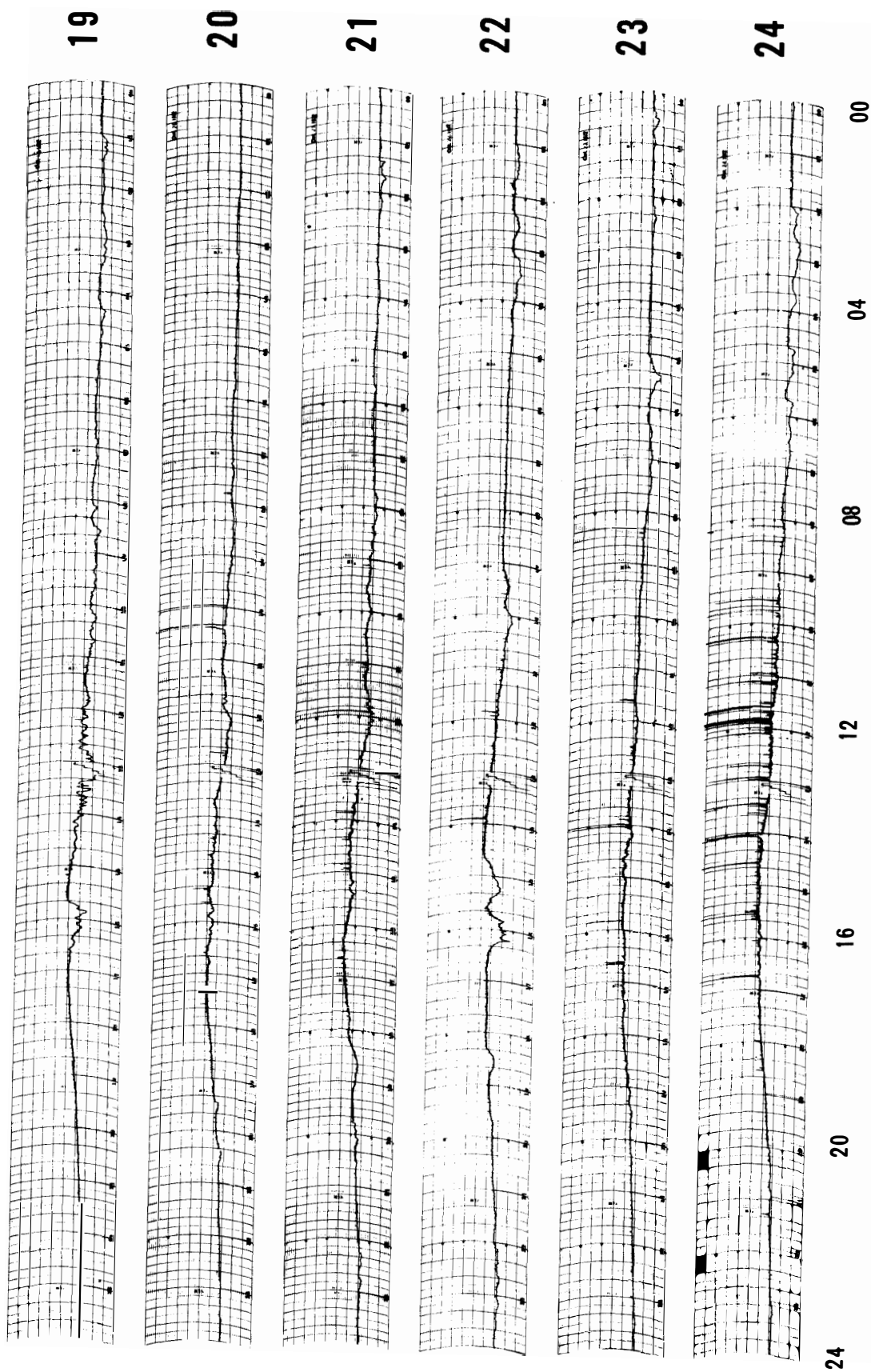
OCT 1972



24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS 30MHZ COSMIC NOISE

OCT 1972



OCT 1972

25

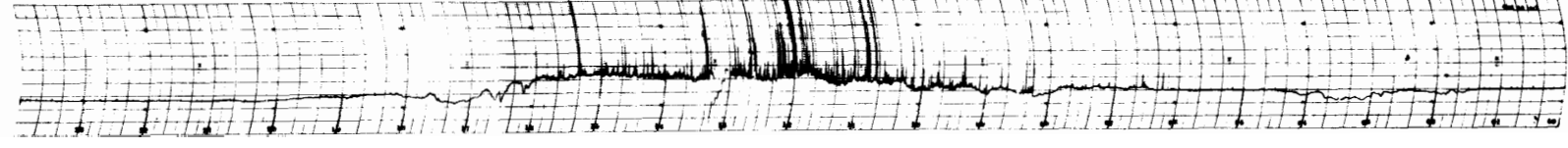
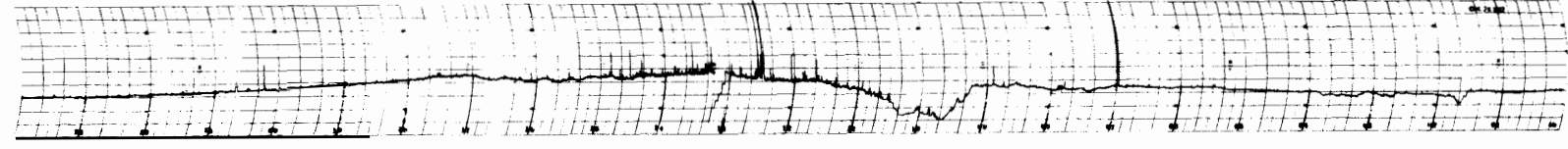
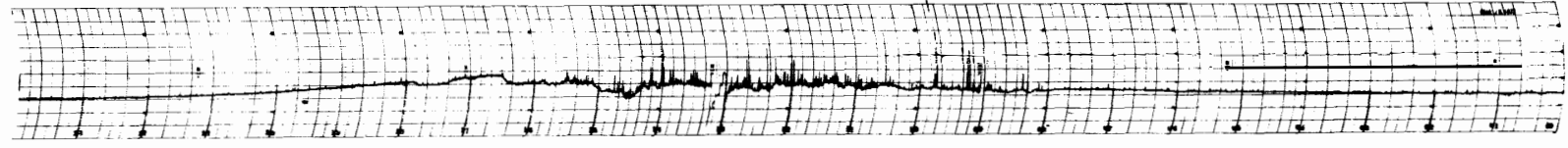
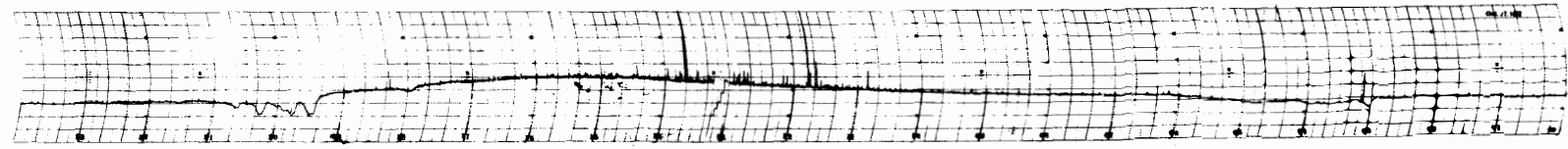
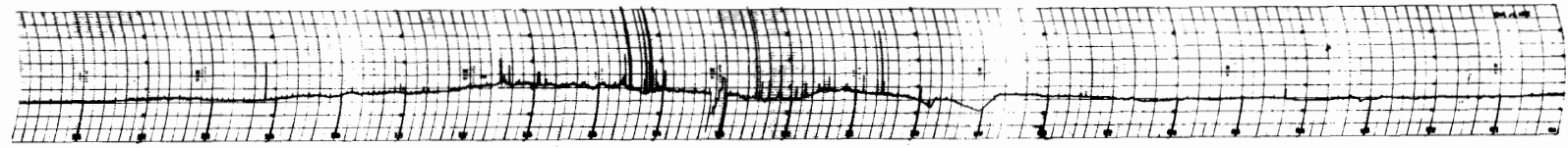
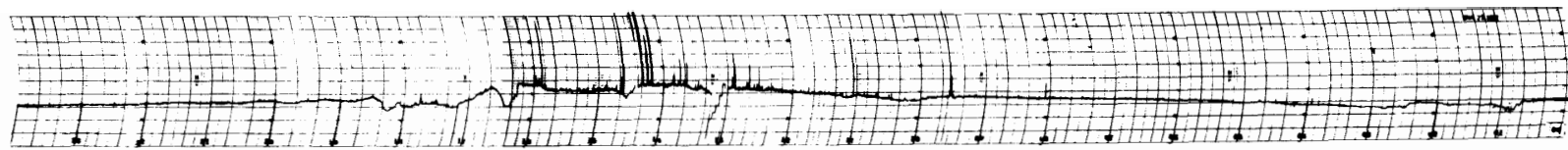
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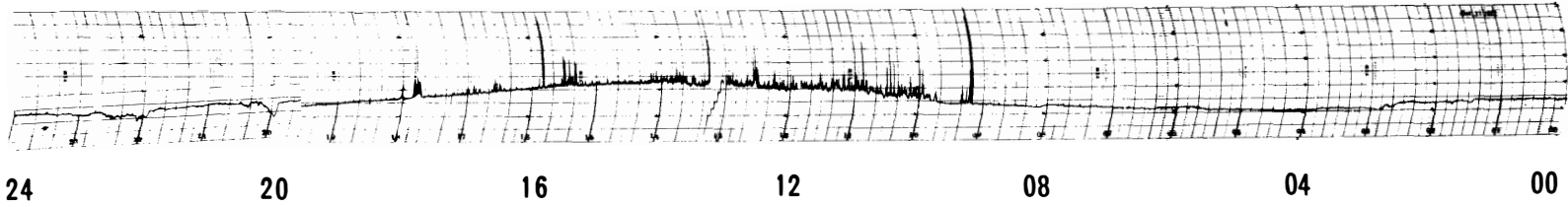


— 63 —

24                      20                      16                      12                      08                      04                      00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE



31

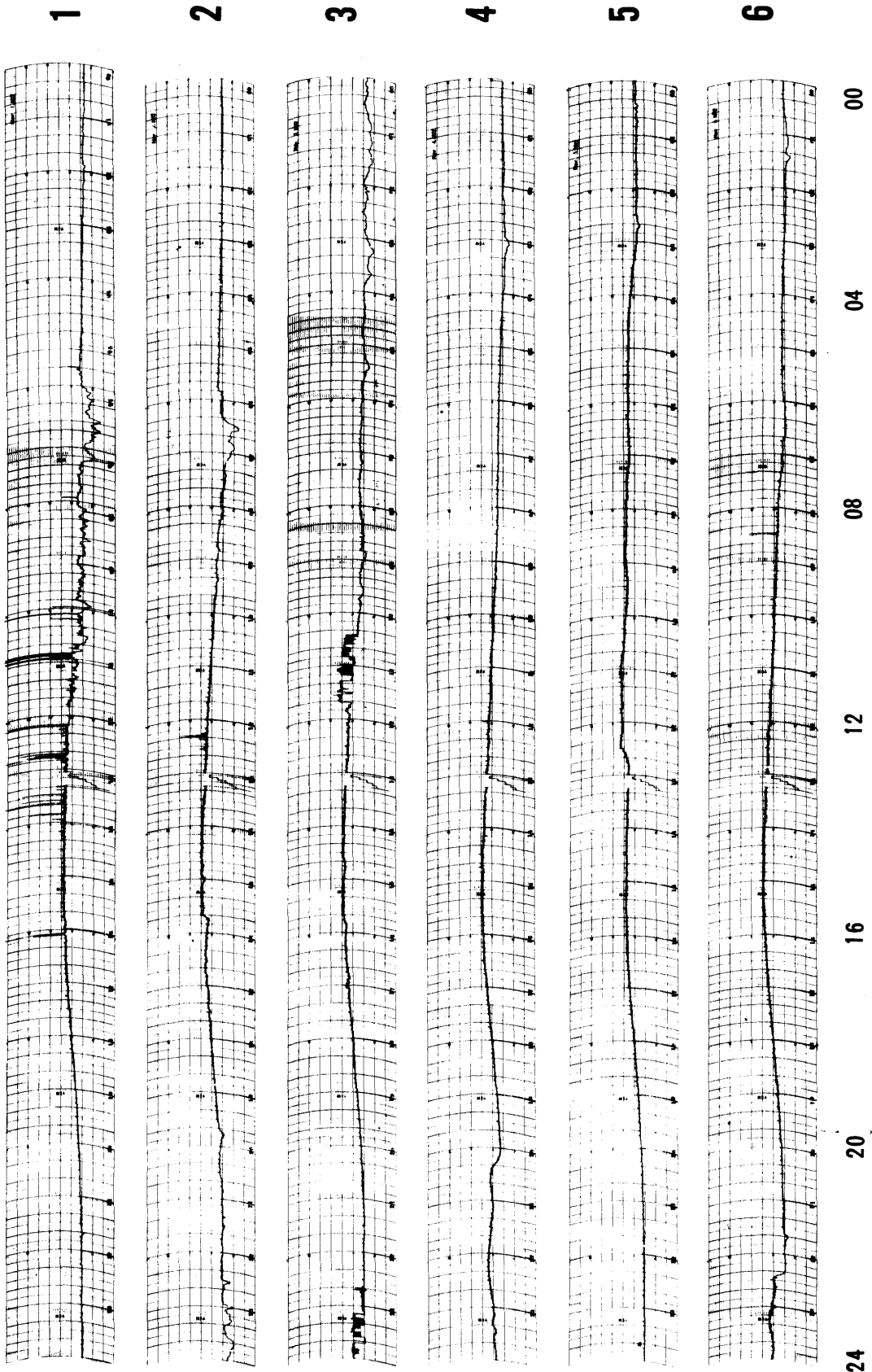
OCT 1972

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE



NOV 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

NOV 1972

7

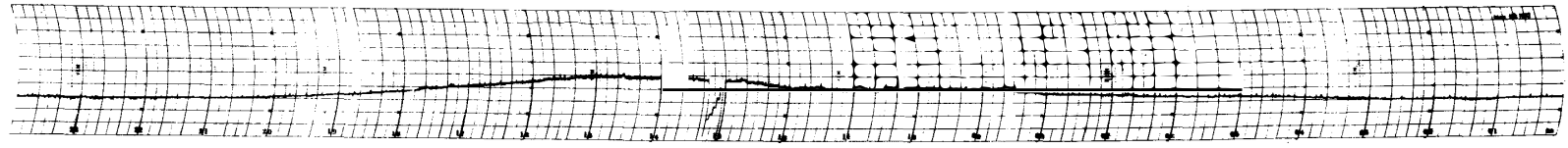
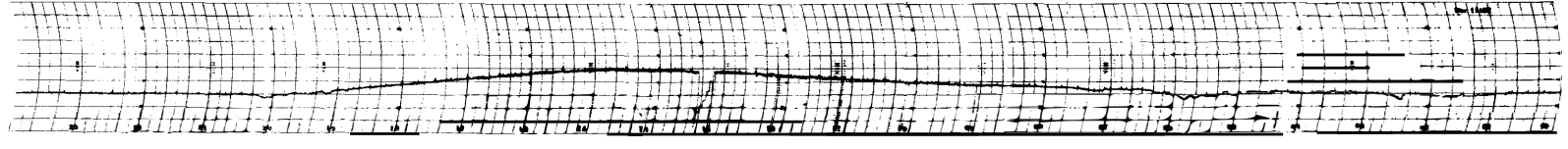
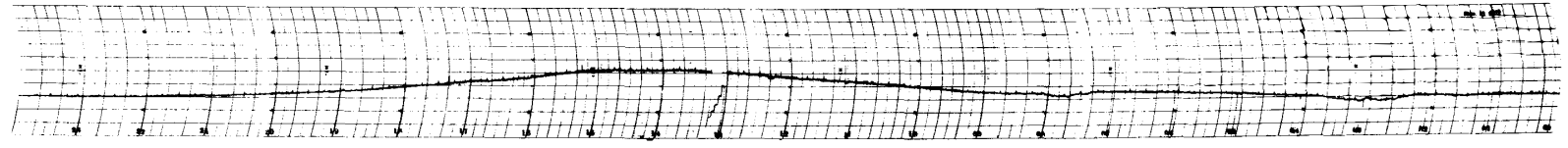
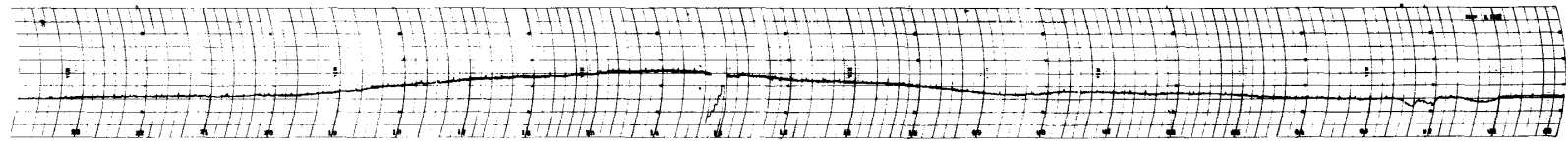
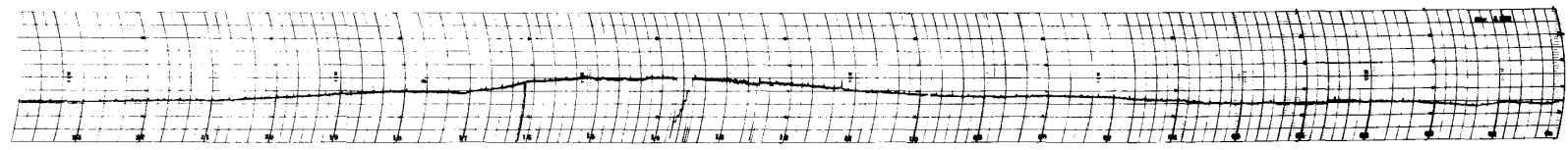
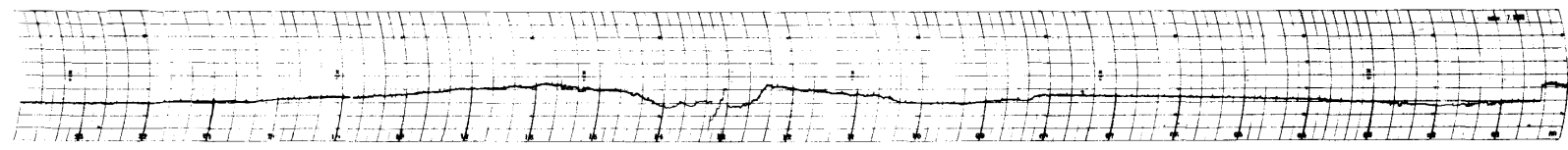
8

9

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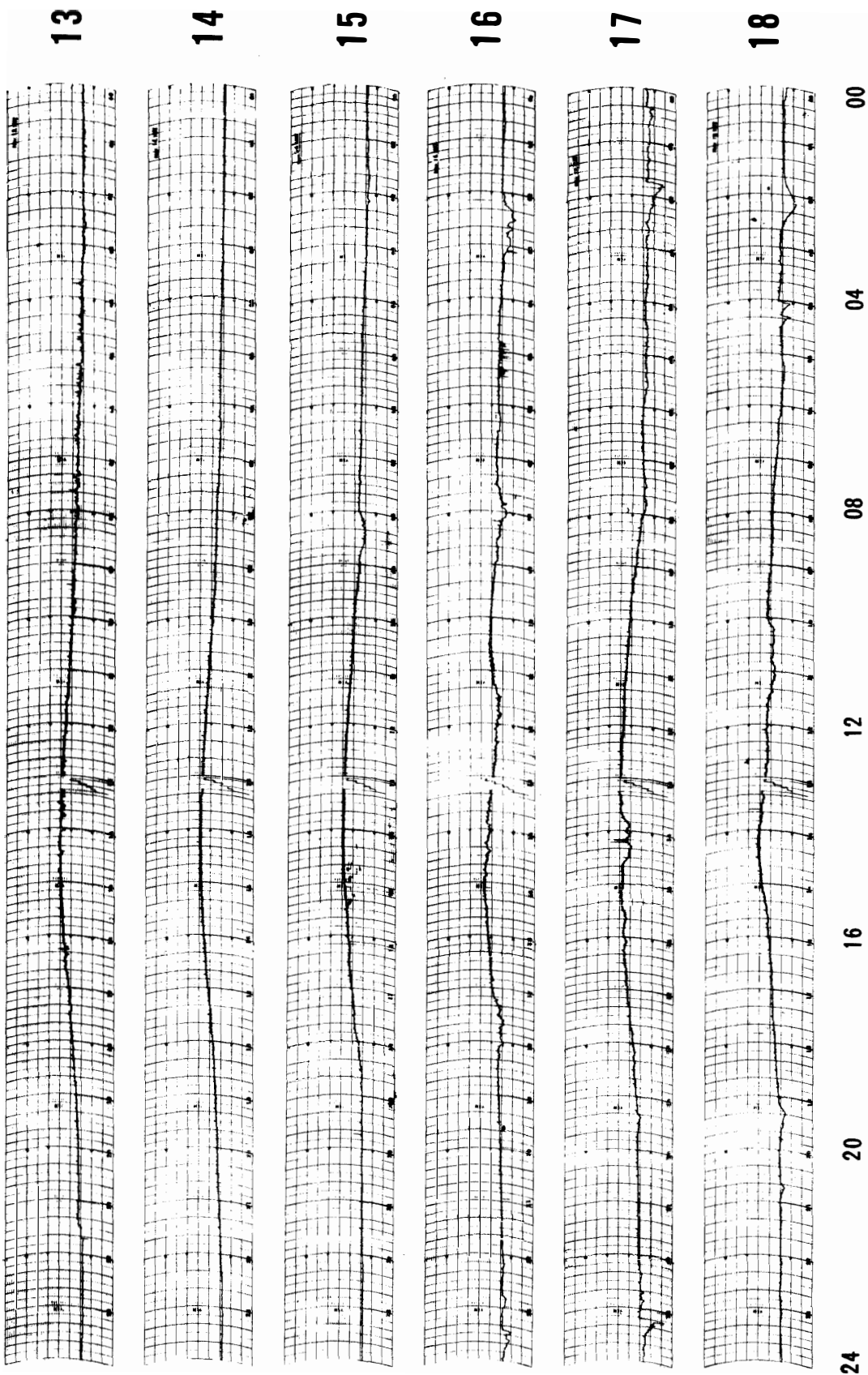


24 20 16 12 08 04 00

45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

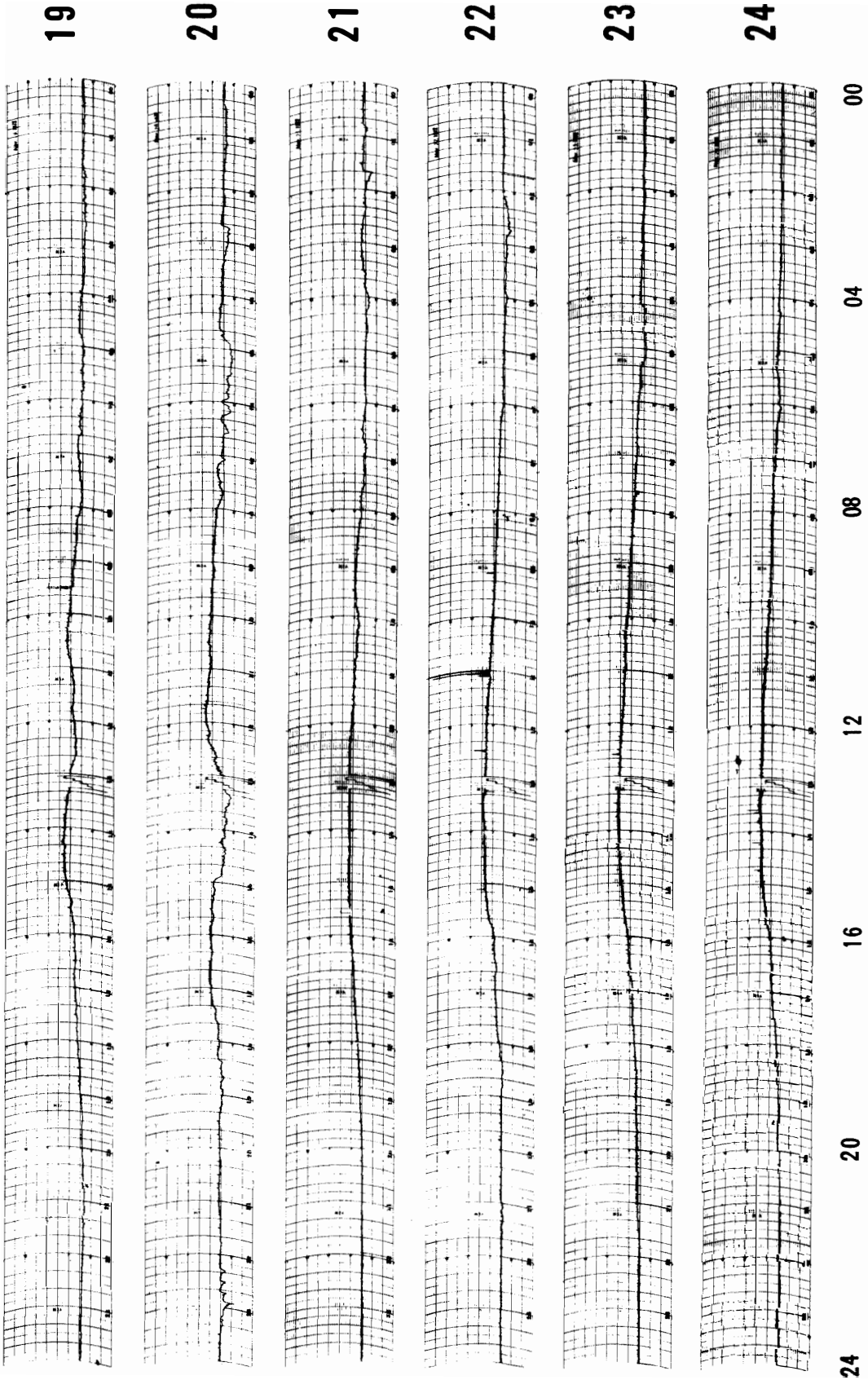
NOV 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

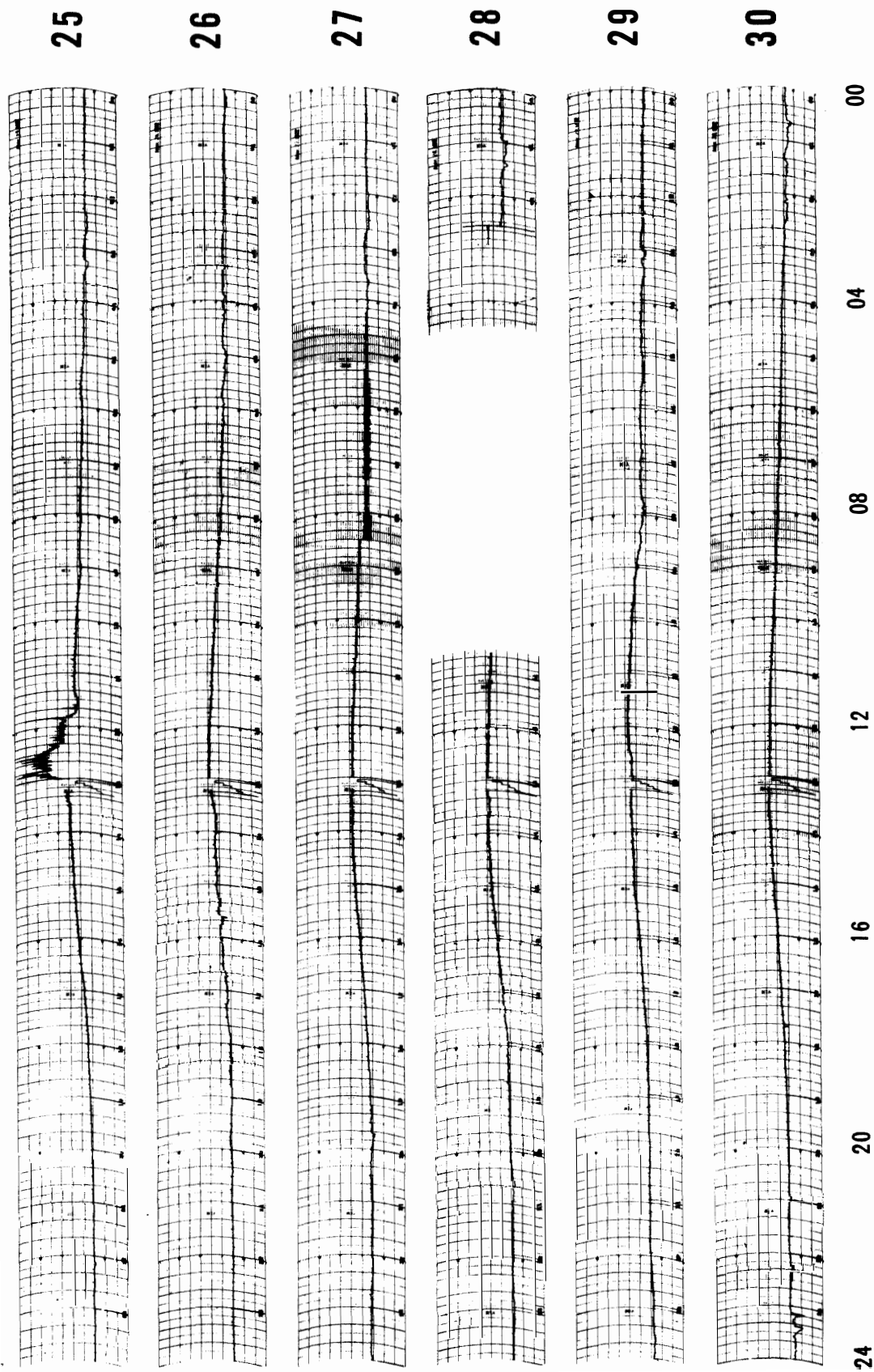
NOV 1972



30MHZ COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

NOV 1972



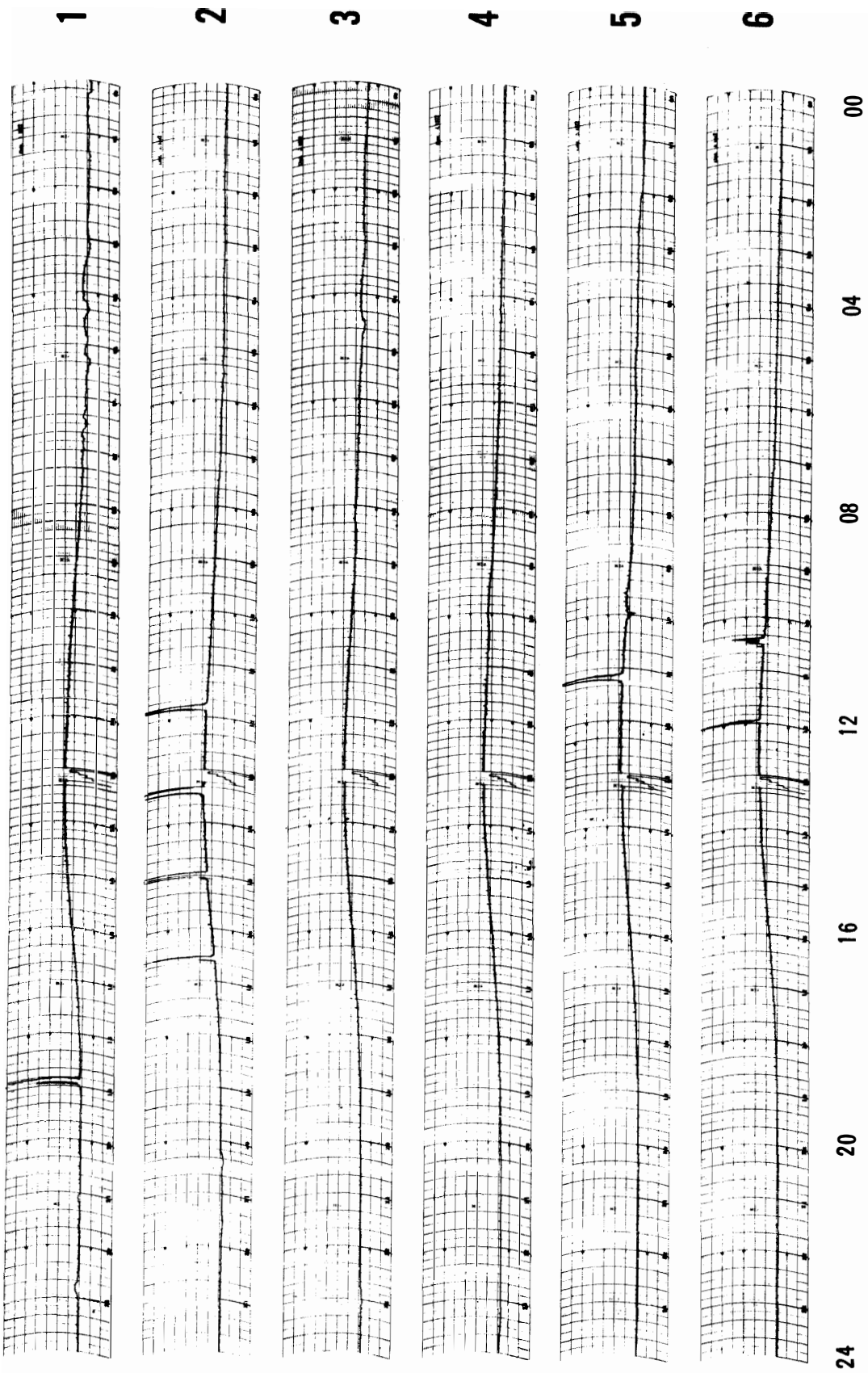
30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

Cosmic noise level obscured or equipment malfunction.

|       |           |                       |
|-------|-----------|-----------------------|
| 1st.  | 1150-1210 | failure of equipment. |
| 3rd.  | 1025-1142 | "                     |
|       | 2309-2400 | "                     |
| 25th. | 1140-1300 | interferences.        |
| 27th. | 0520-0830 | "                     |
| 28th. | 0234-1040 | failure of equipment. |

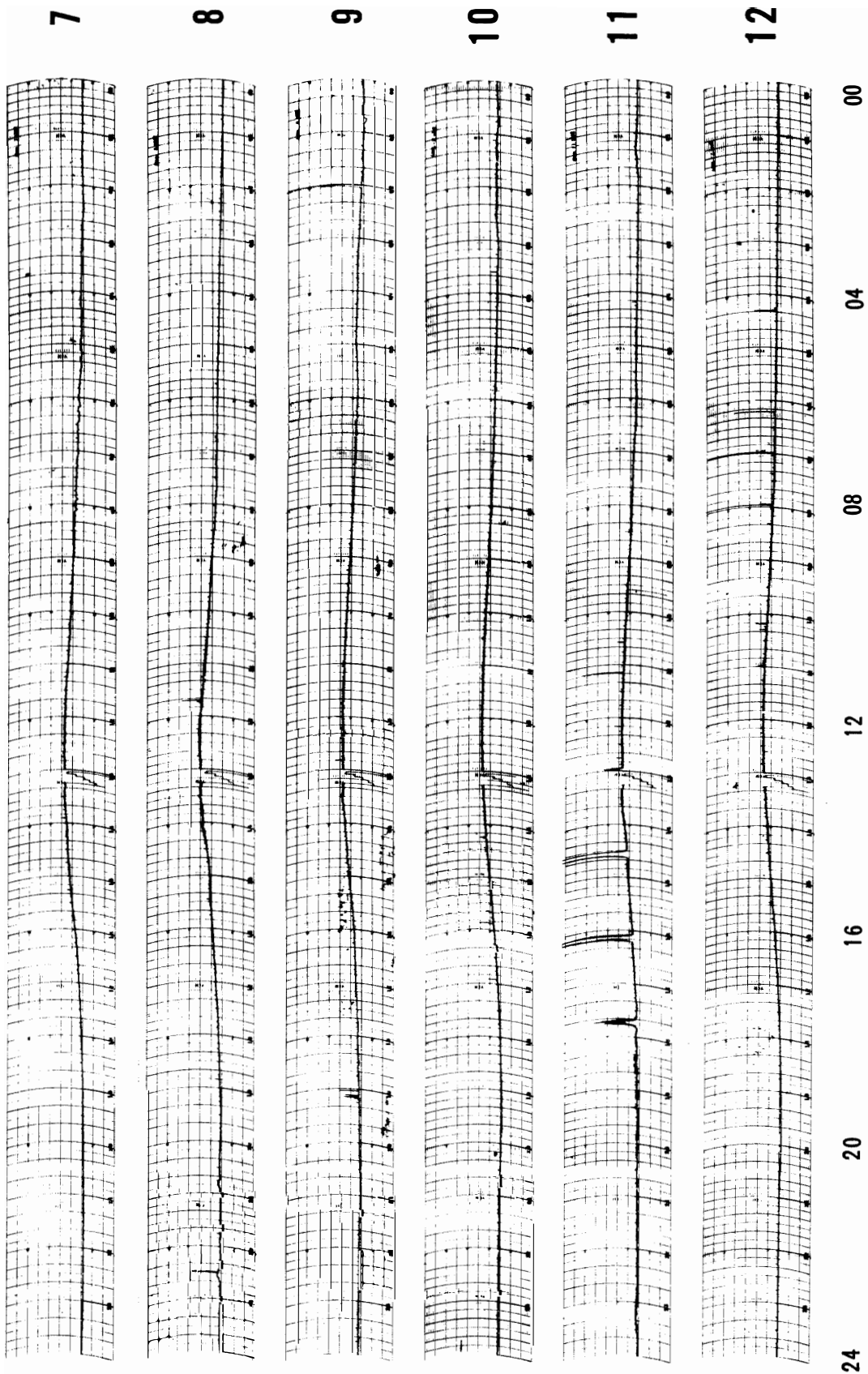
DEC 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

DEC 1972

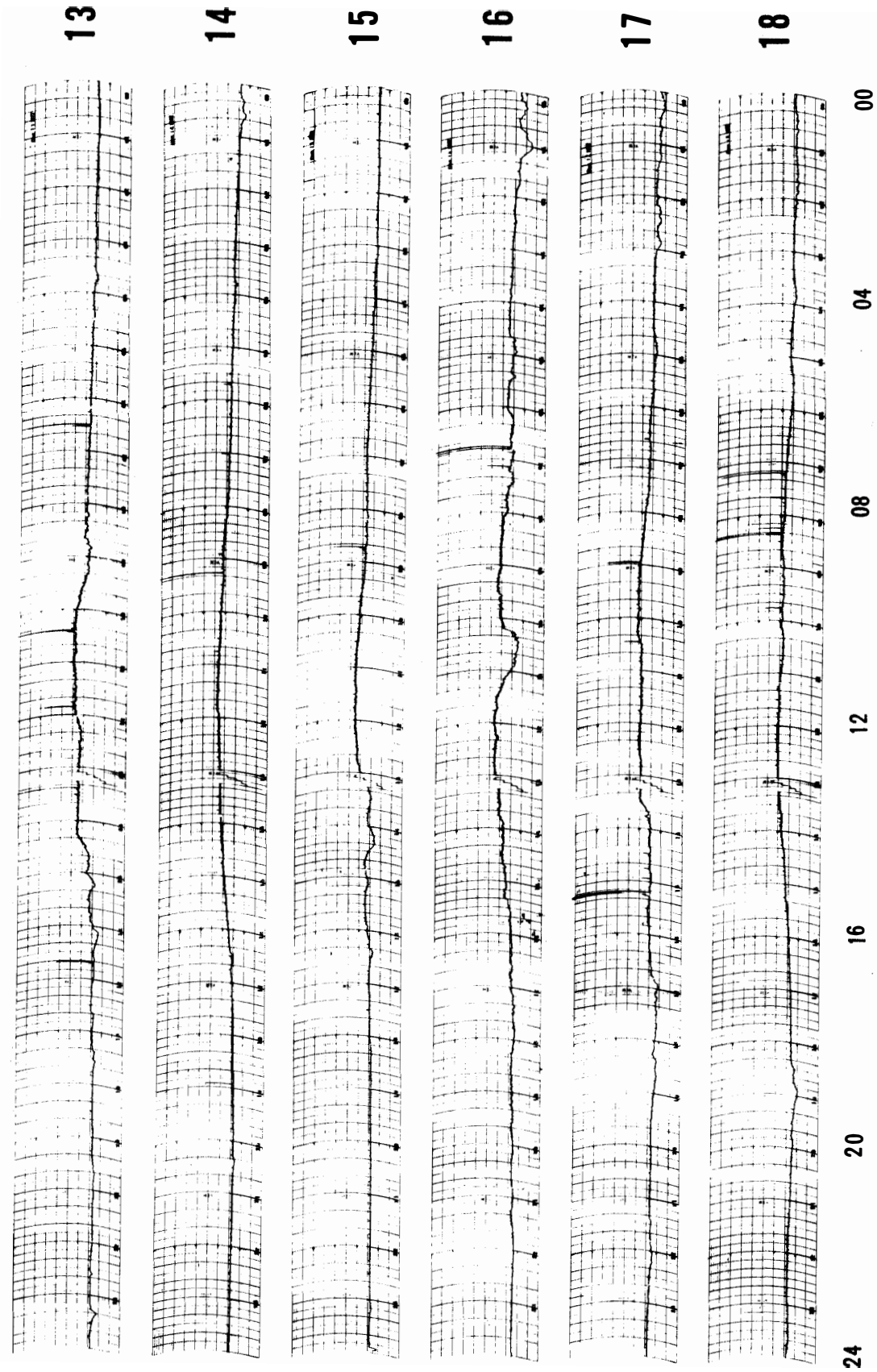


30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



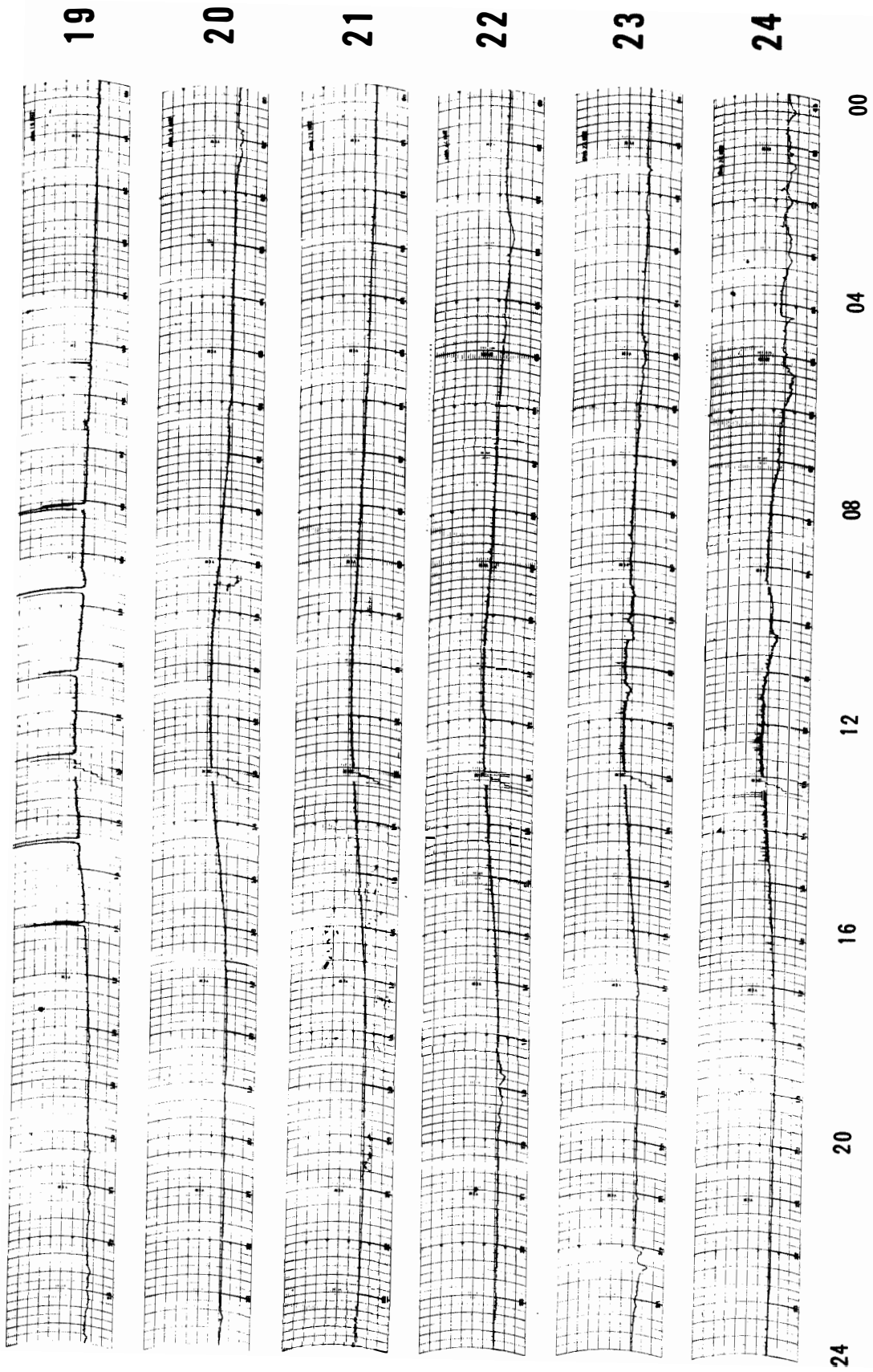
DEC 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

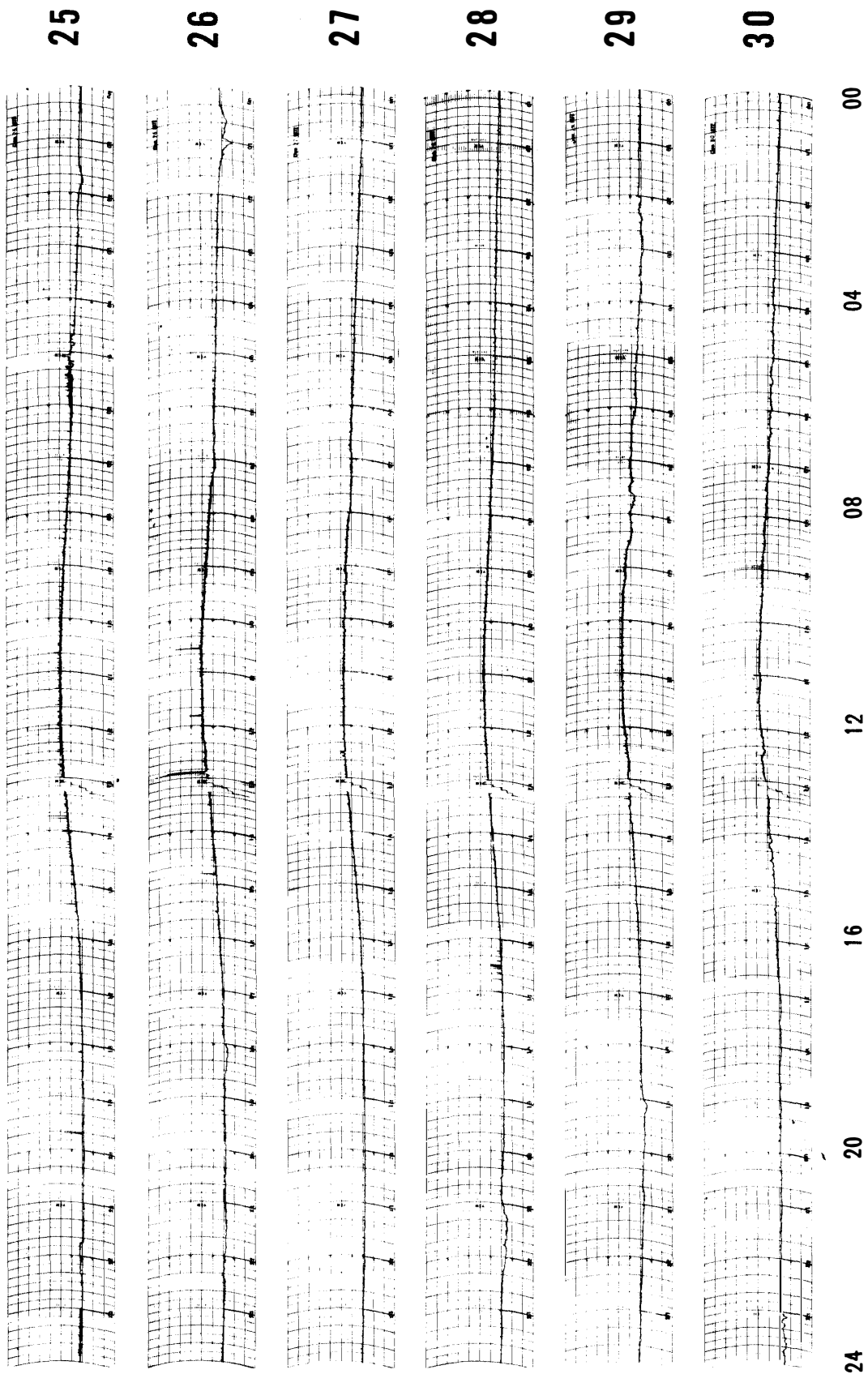
DEC 1972



30MHz COSMIC NOISE

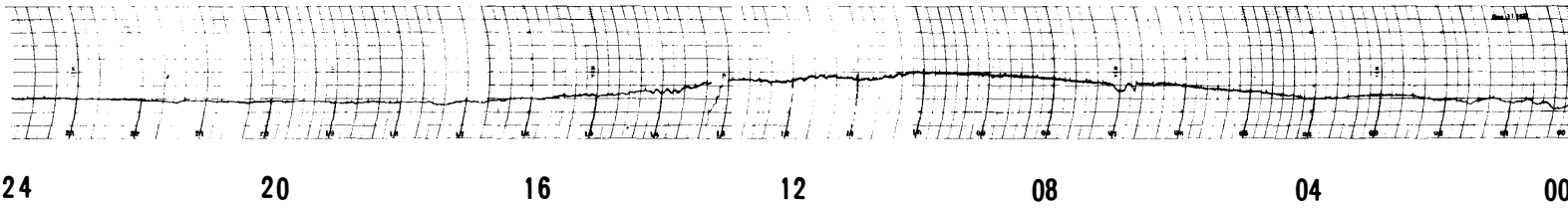
45° EAST MERIDIAN TIME IN HOURS

DEC 1972



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS



45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

31

DEC 1972