Riometer Records of 30 MHz Cosmic Noise at Syowa Station, Antarctica in 1973

Ichizo NISHIMUTA and Hisashi YABUUMA

(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, 1973 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 1973

Susumu ISOZAKI (Radio Research Laboratories)
Shigeru MIYAZAKI (Radio Research Laboratories)

February to December 1973

Ichizo NISHIMUTA (Radio Research Laboratories)
Hisashi YABUUMA (Radio Research Laboratories)

4. Method of measurment

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.

Fig. 1 shows the monthly range of time of the maximum value of diurnal variation of cosmic noise power on quiet days, and the time of the minumum value.

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

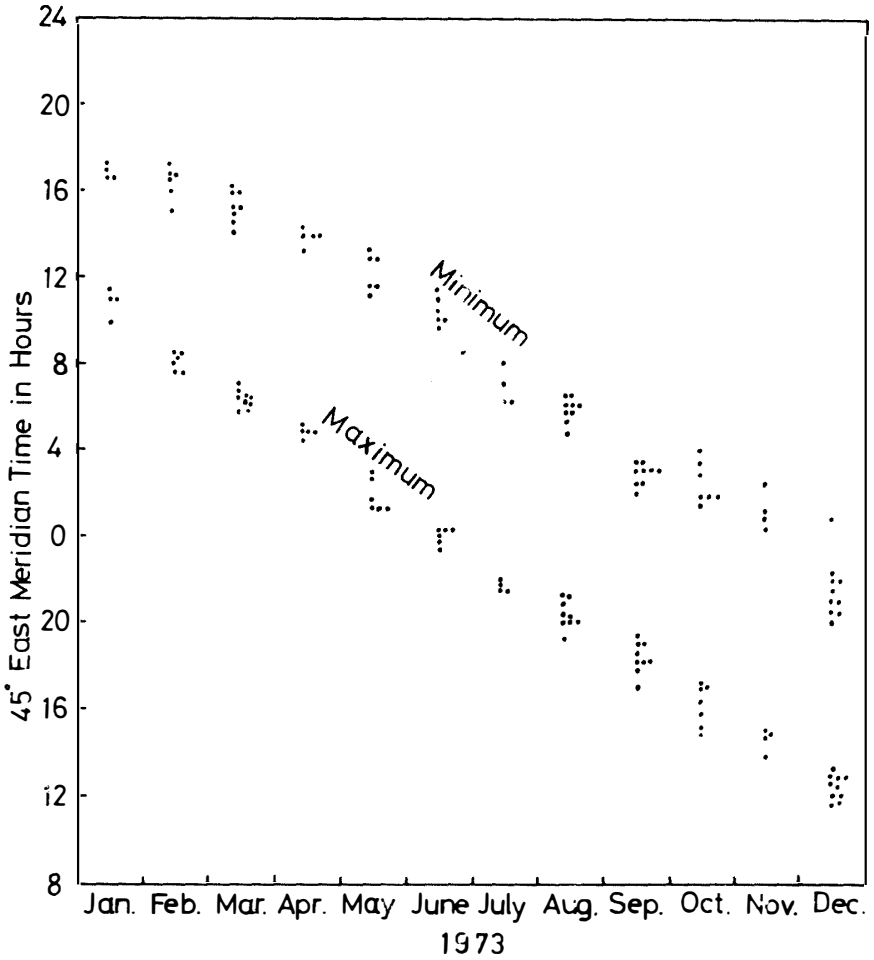

Fig. 1. Monthly range of the maximum values and the minimum values of cosmic noise power at Syowa Station.

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.

Isozaki, S. and S. Miyazaki (1973): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica in 1972. JARE Data Rep., No. 20 (Ionosphere), 76pp.

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Ota, Y. (1970): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica, 1969. JARE Data Rep., No. 8 (Ionosphere), 74pp.

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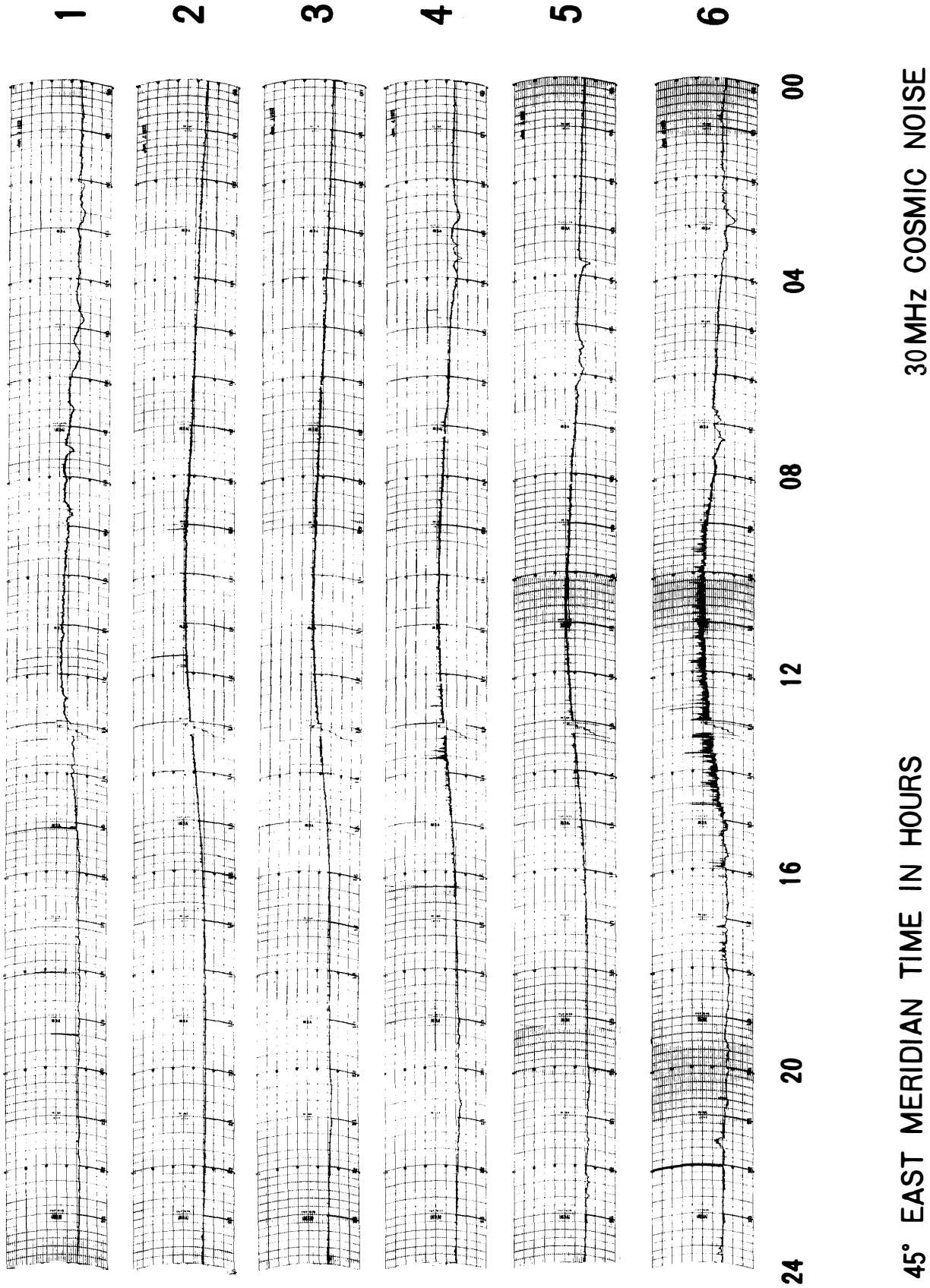
JAN 1973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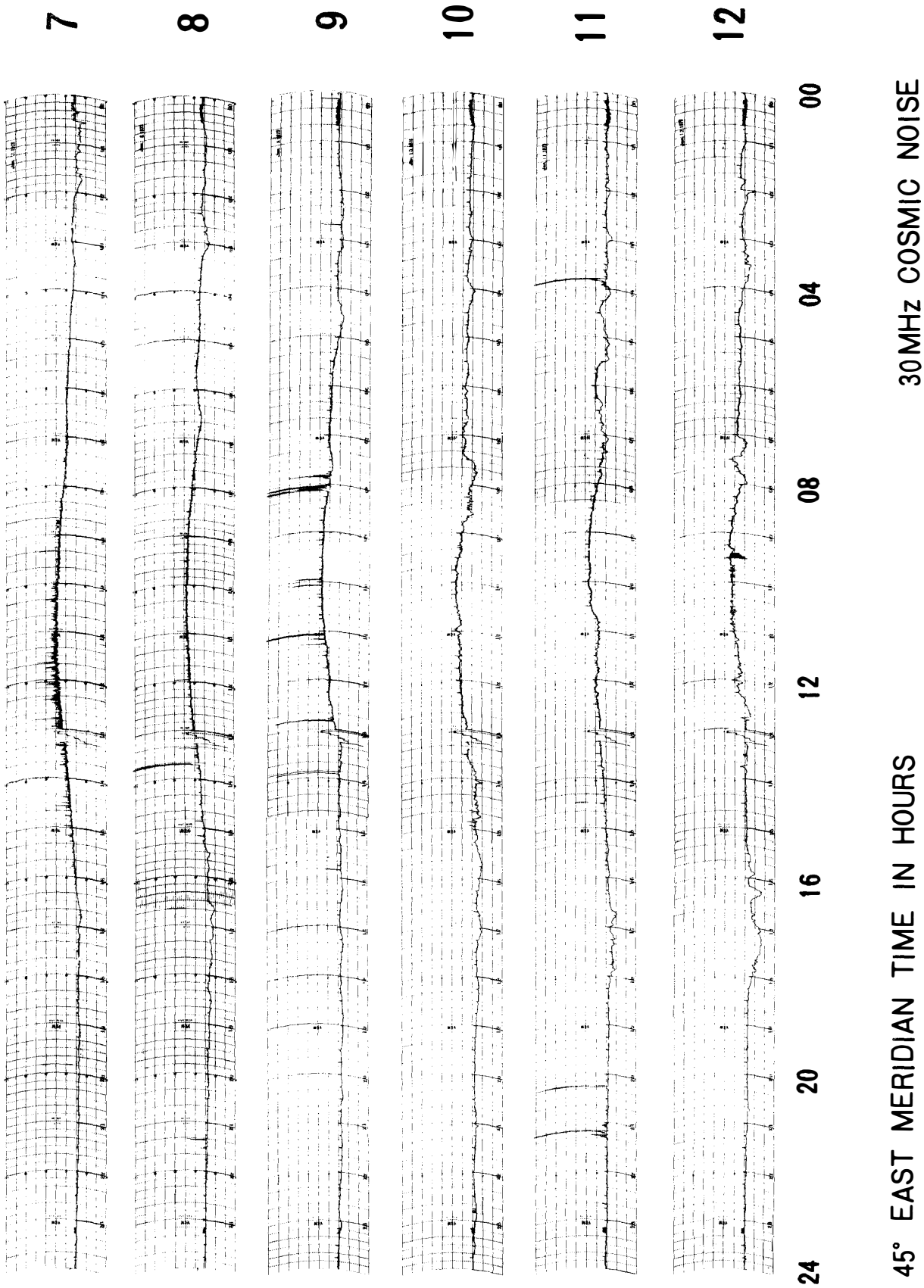
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

JAN 1973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30MHz COSMIC NOISE
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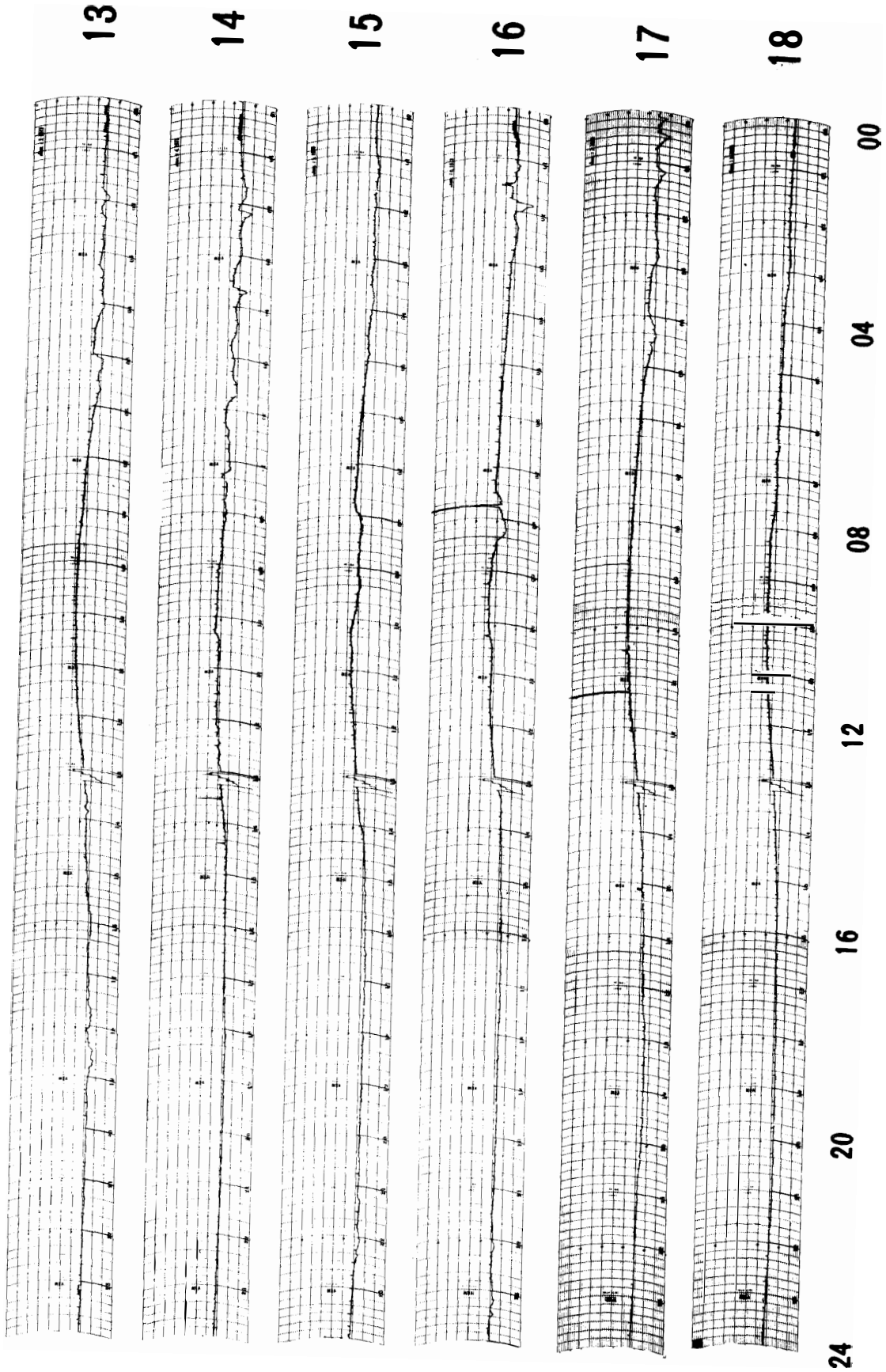
JAN 1973



30 MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

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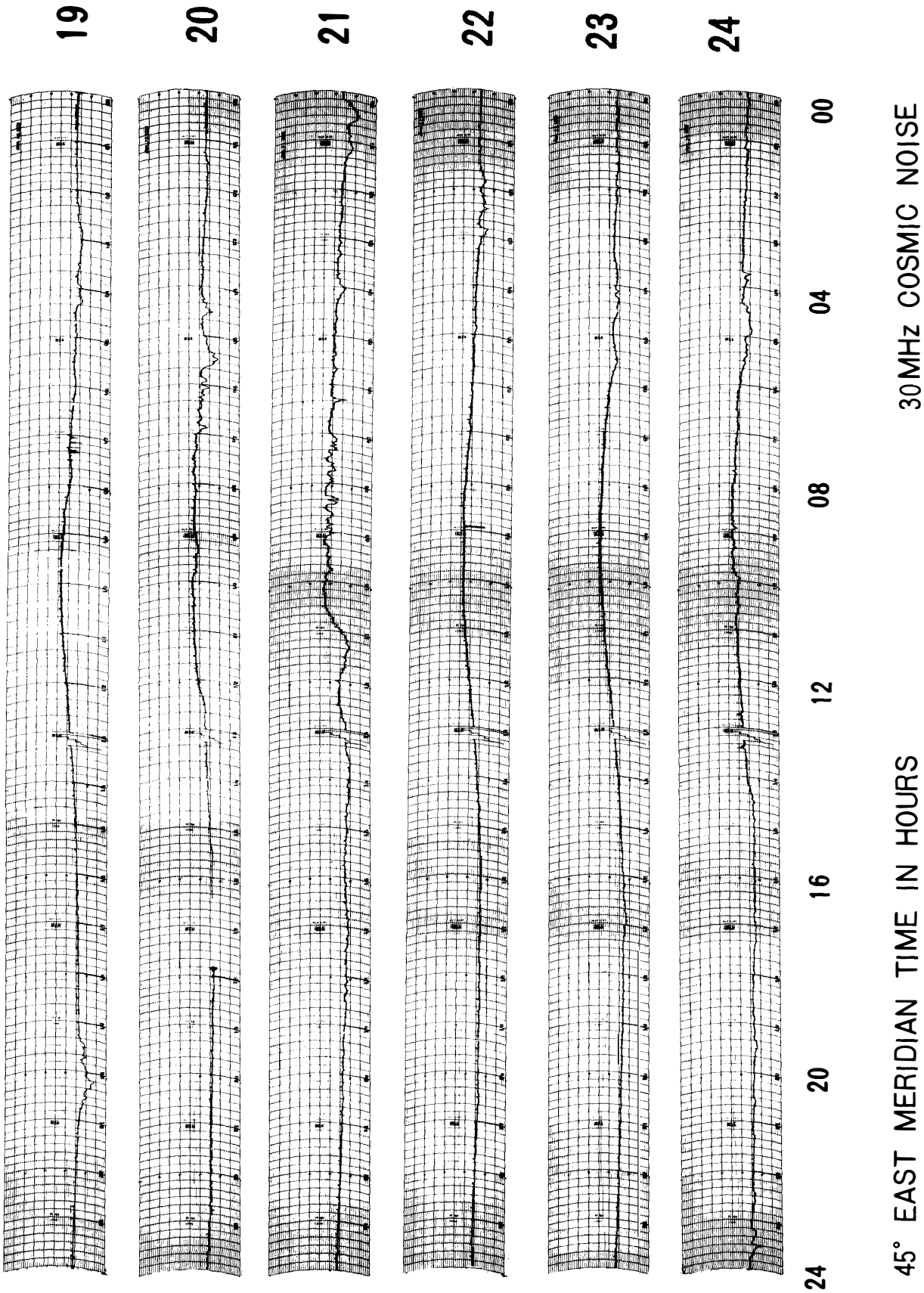
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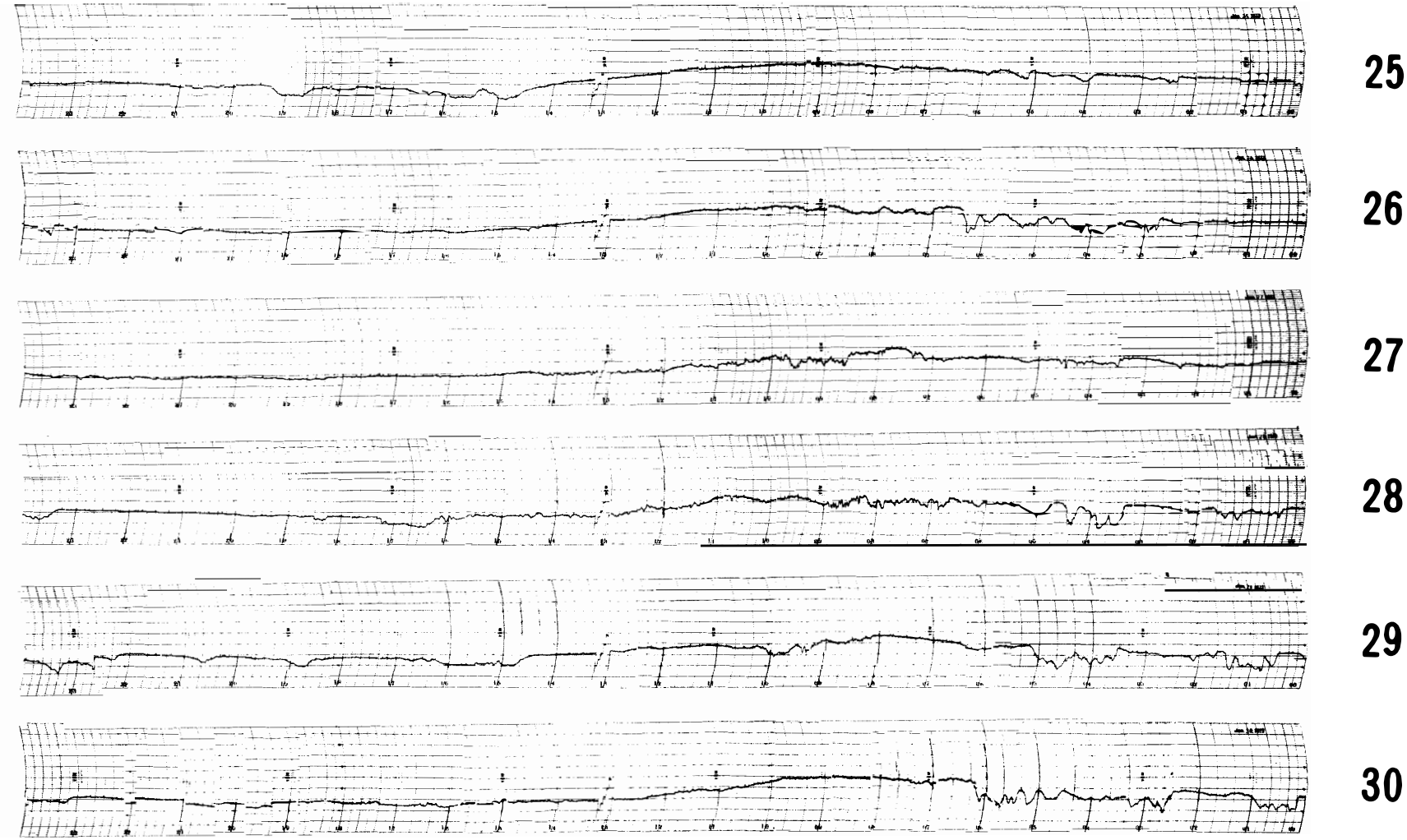
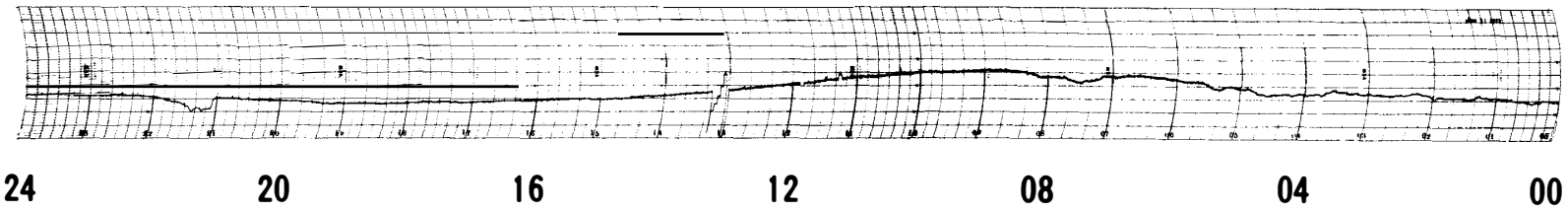


45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE



31 JAN 1973

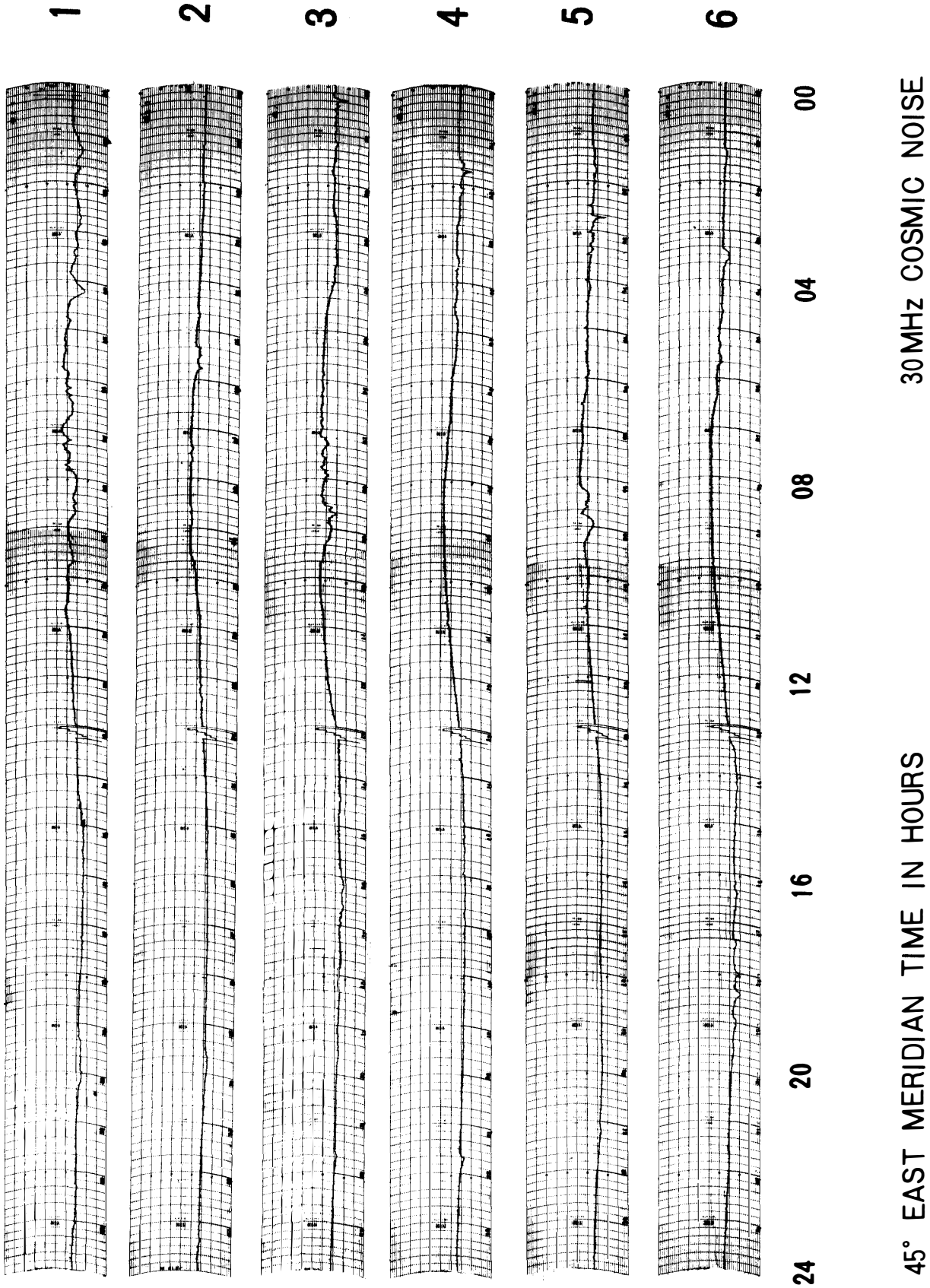
45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

20th. 1625-1750 failure of equipment.

FEB 1973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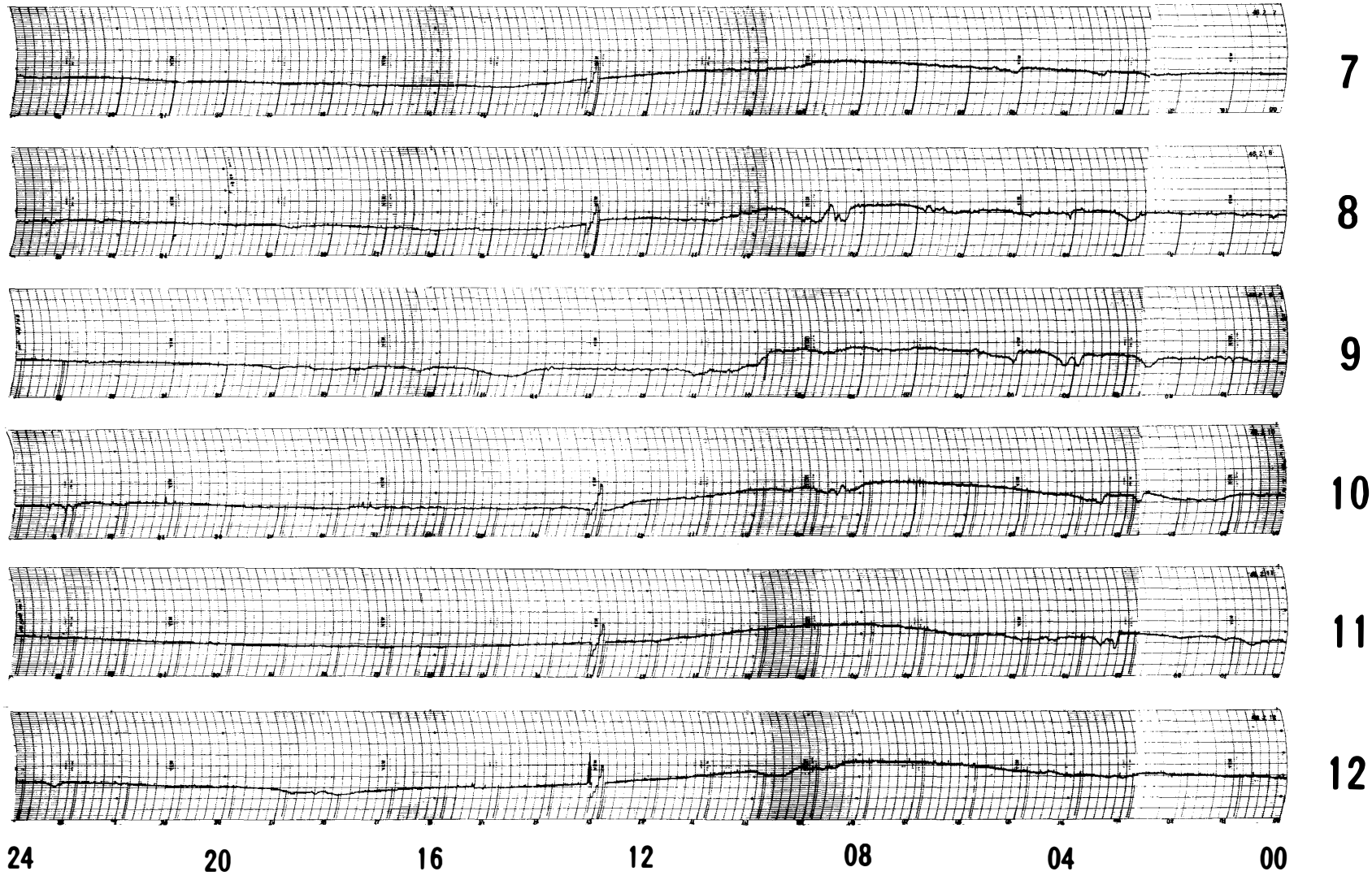

45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

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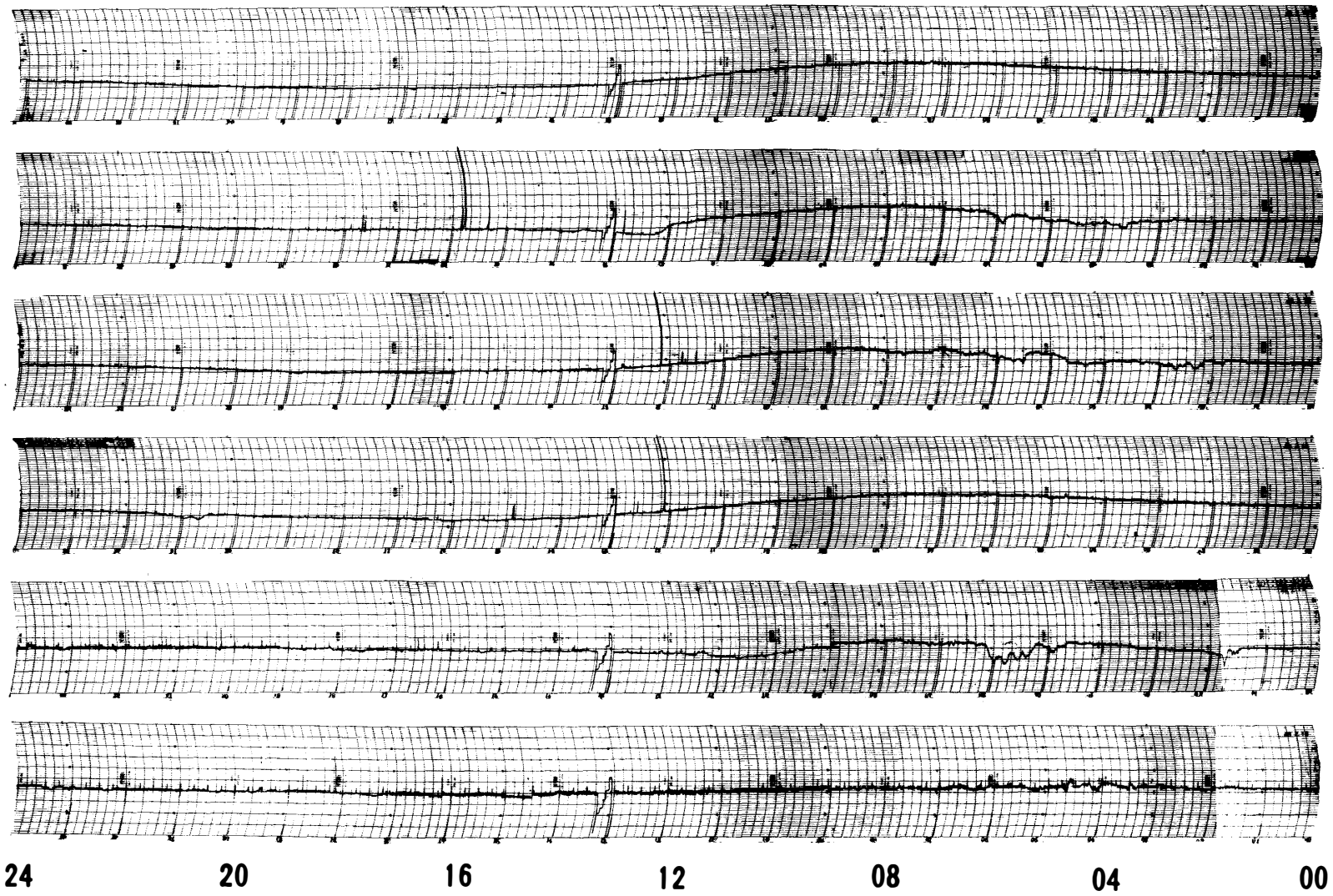

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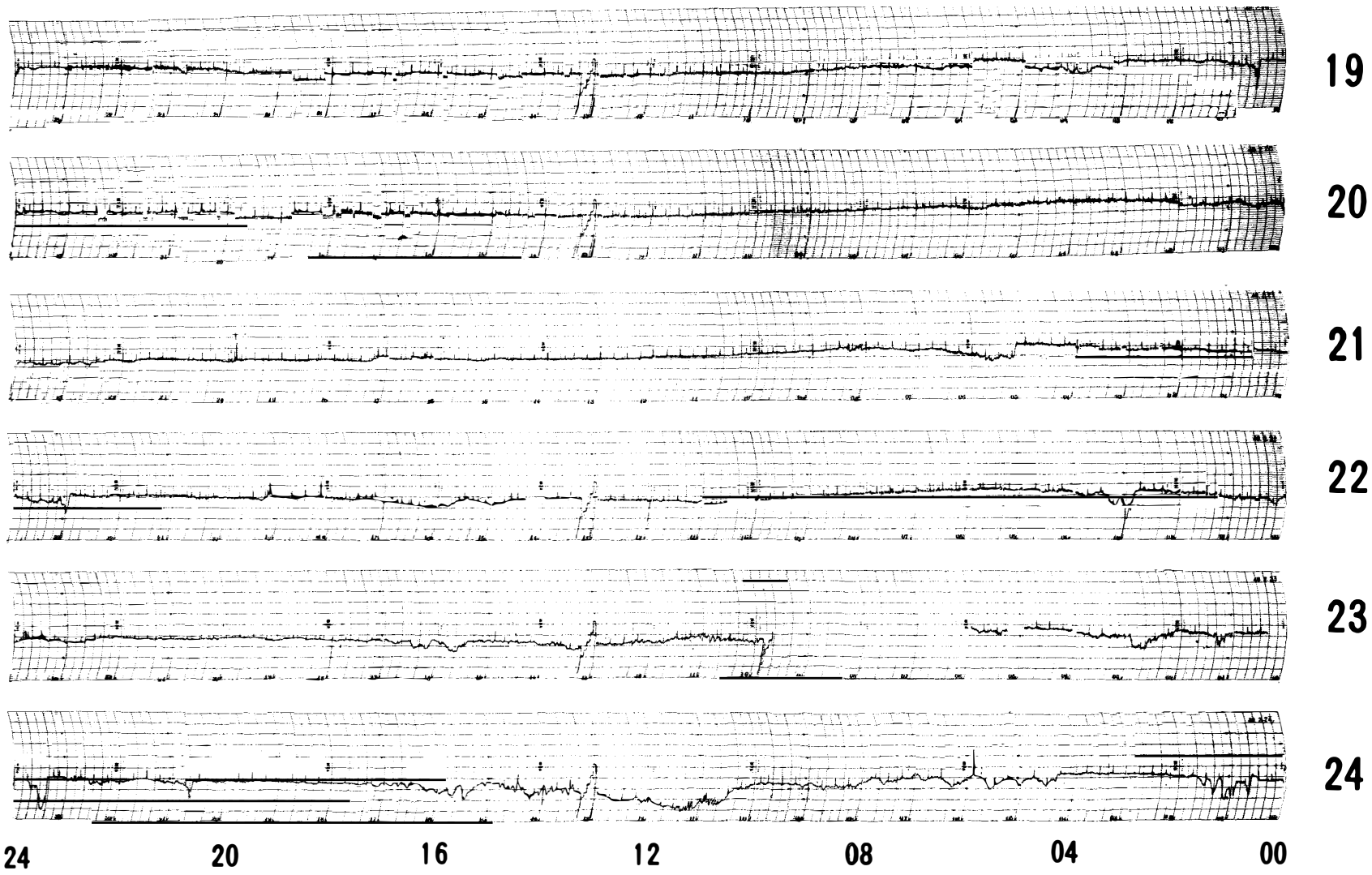
30 MHz COSMIC NOISE



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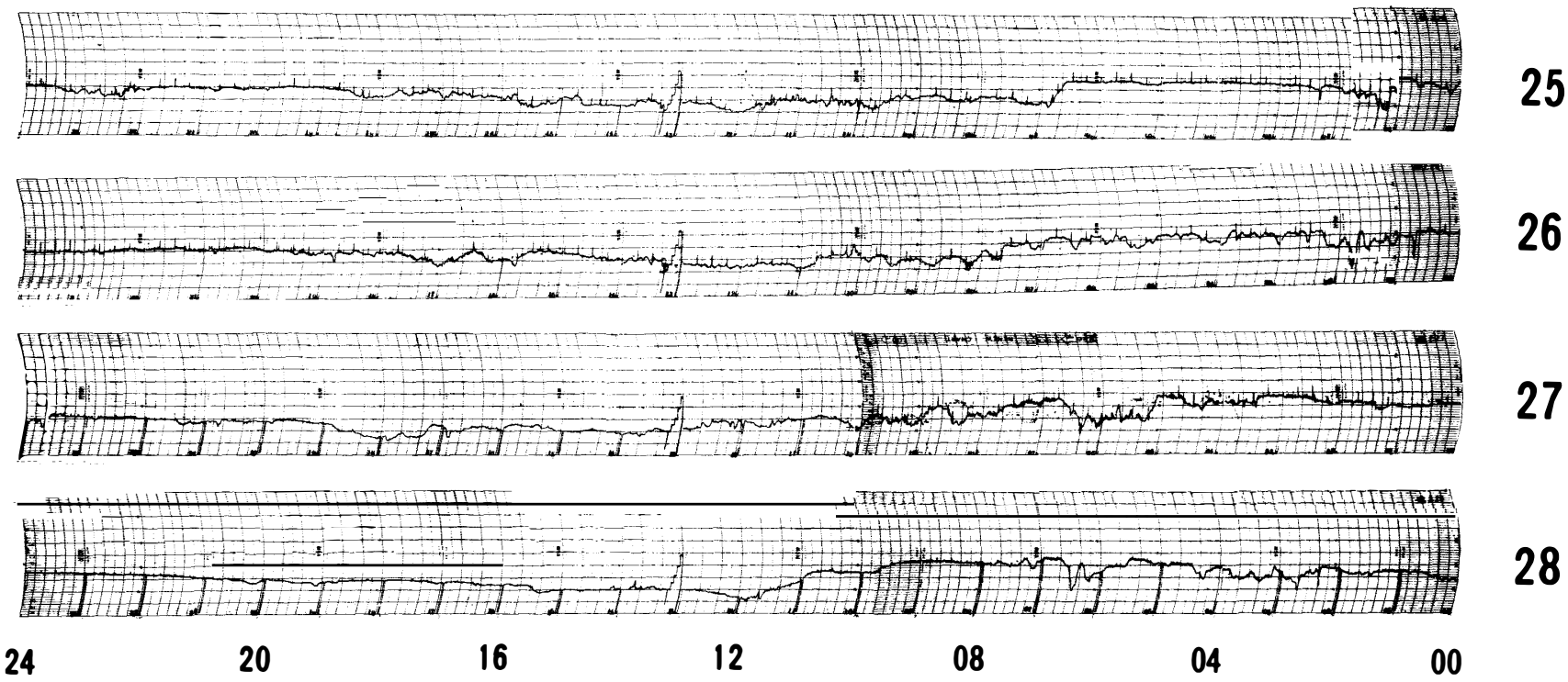
30 MHz COSMIC NOISE



45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

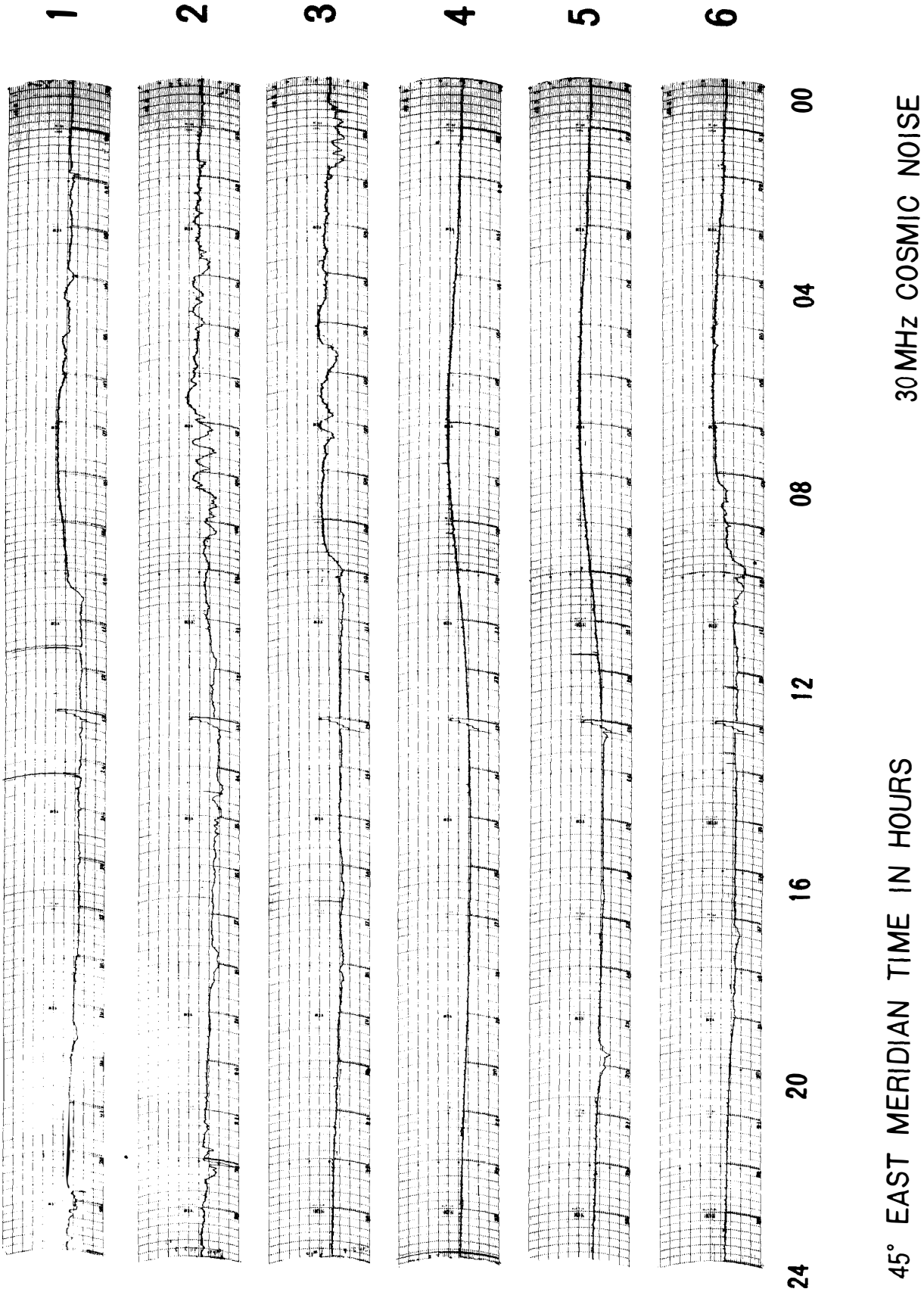
FEB 1973

Cosmic noise level obscured or equipment malfunction

22th. 1400-1420 failure of equipment.

23th. 0500-1000 〃

MAR 1973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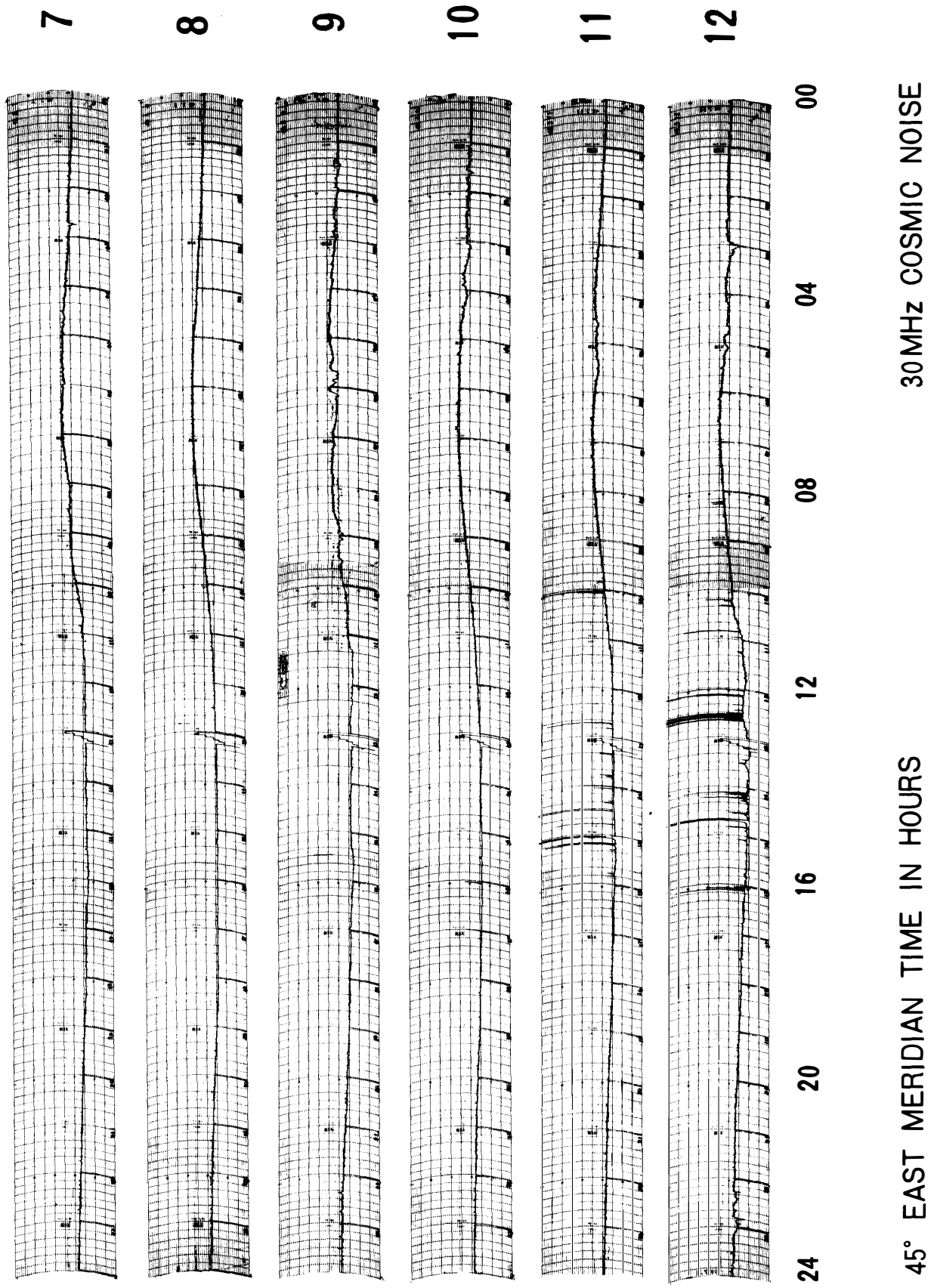
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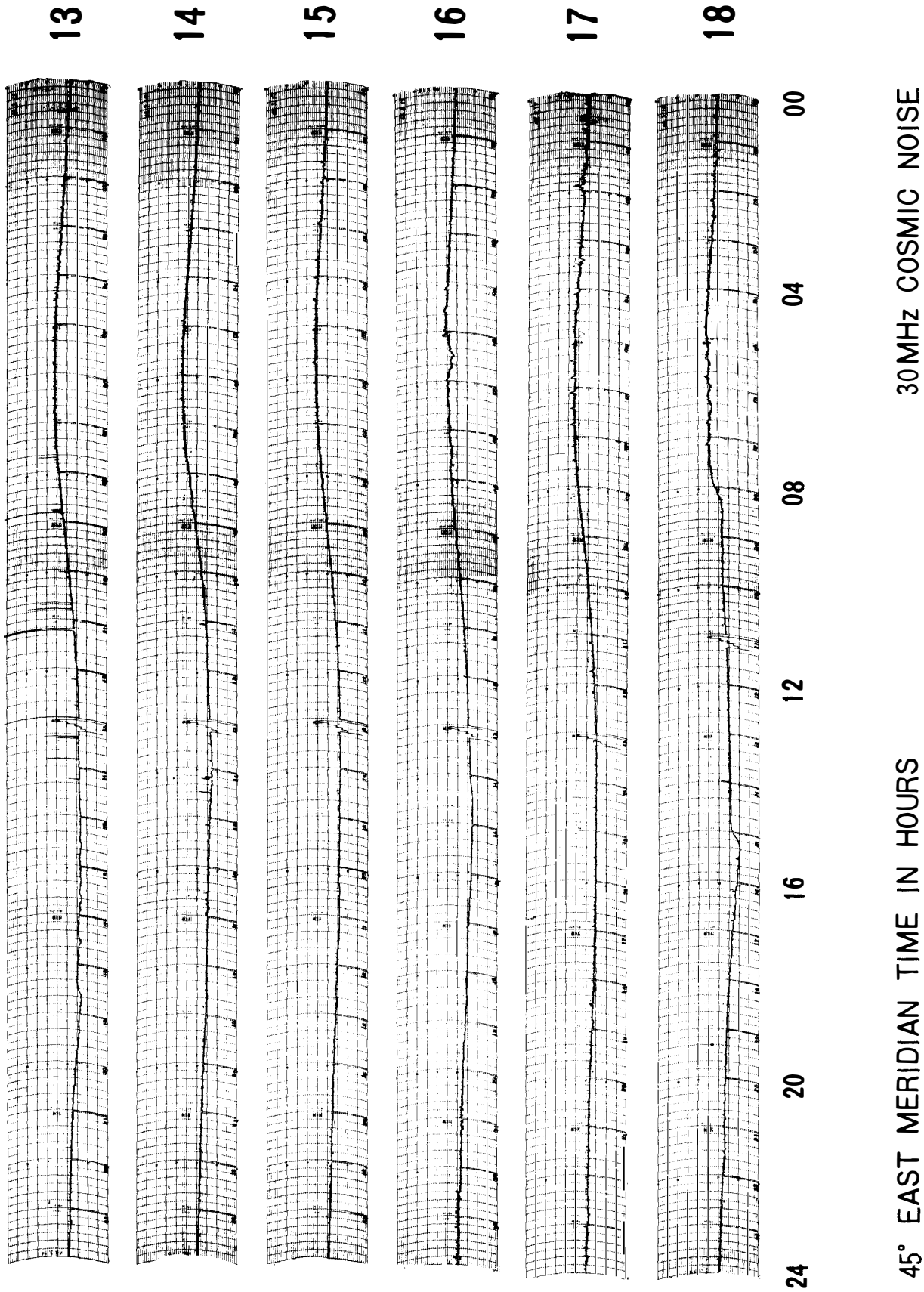
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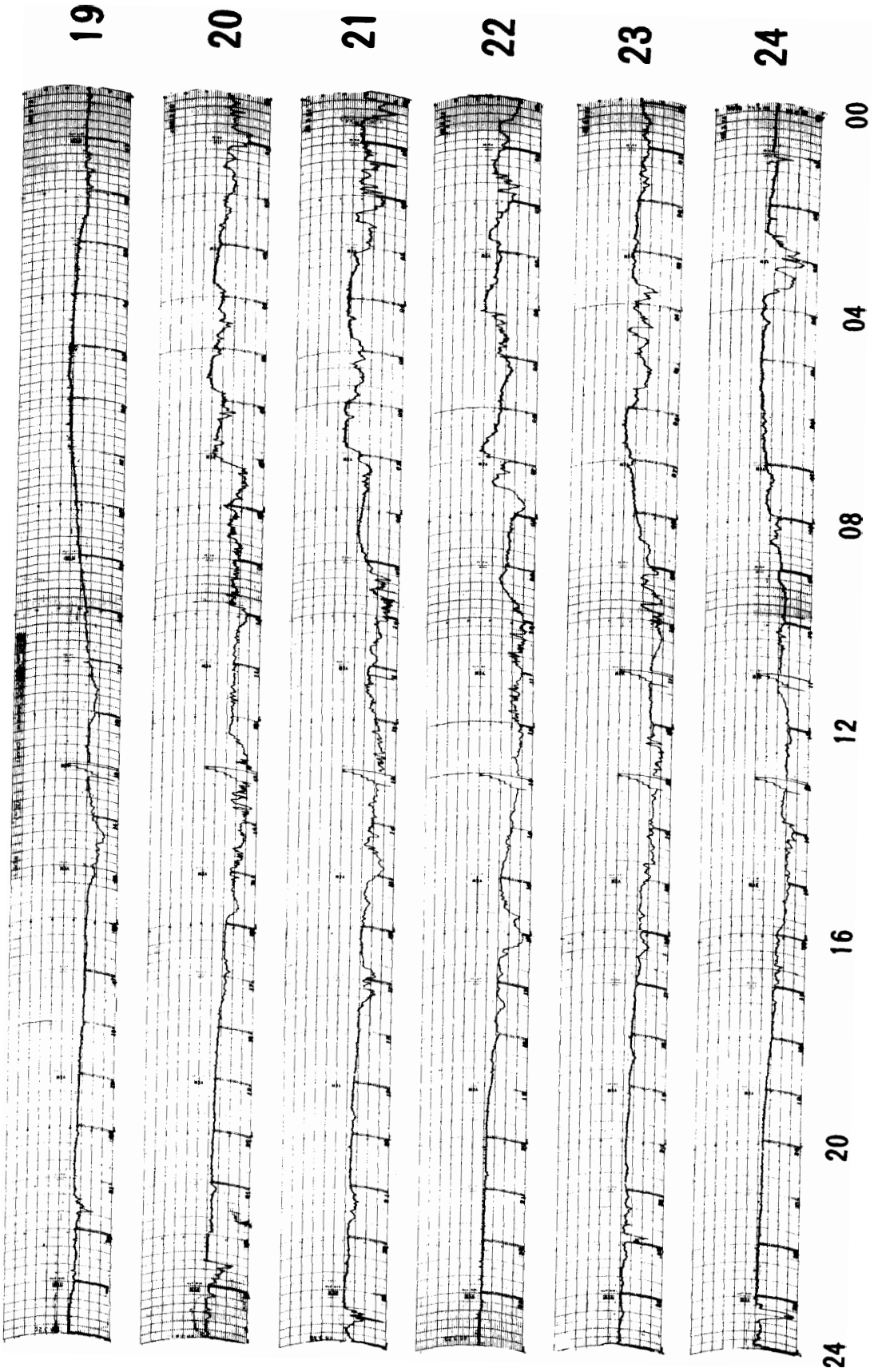

30MHz COSMIC NOISE

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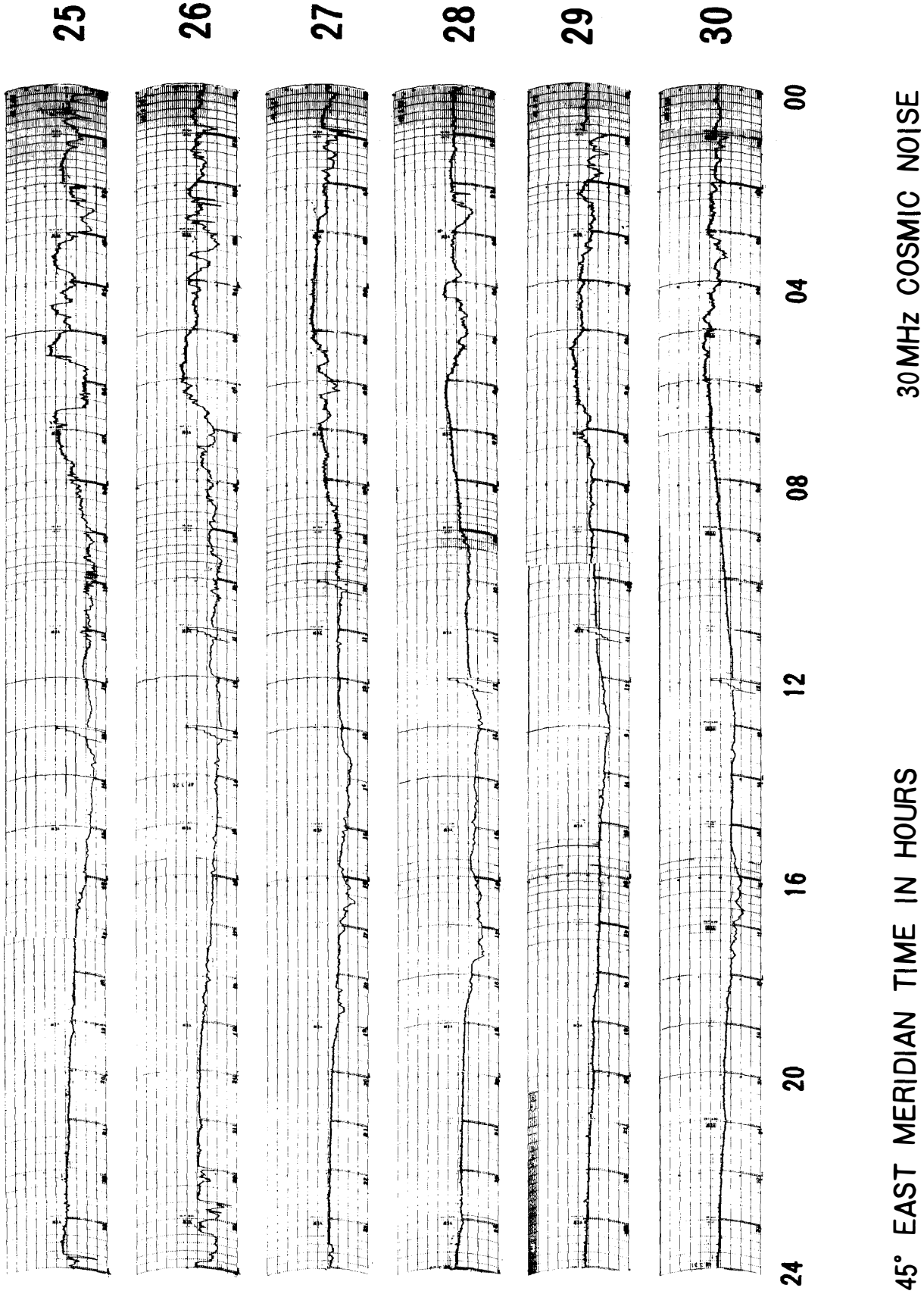
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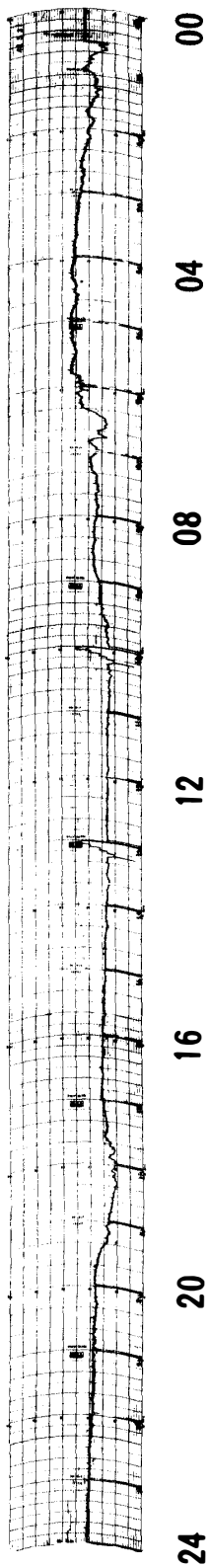
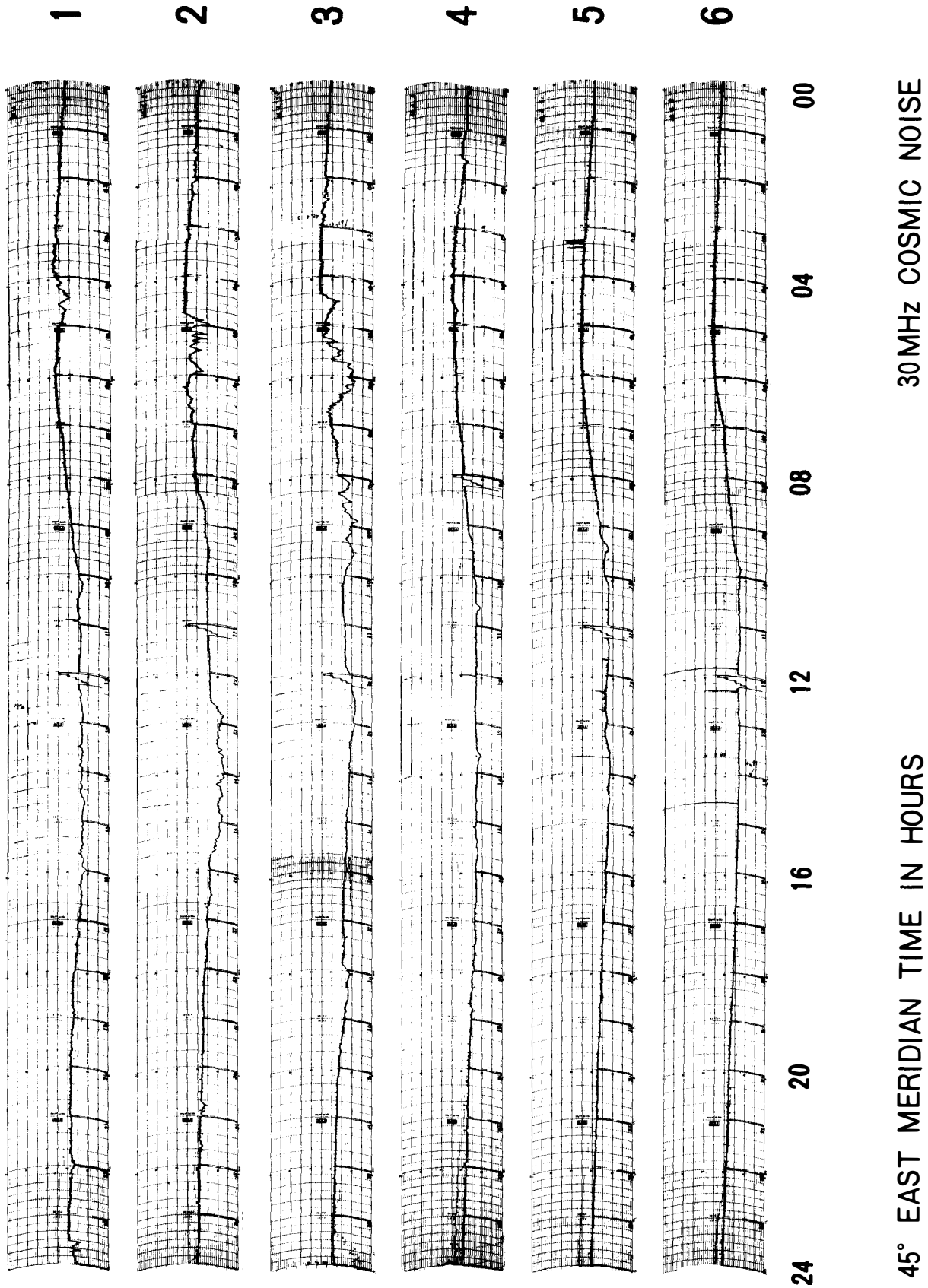


45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

APR 1973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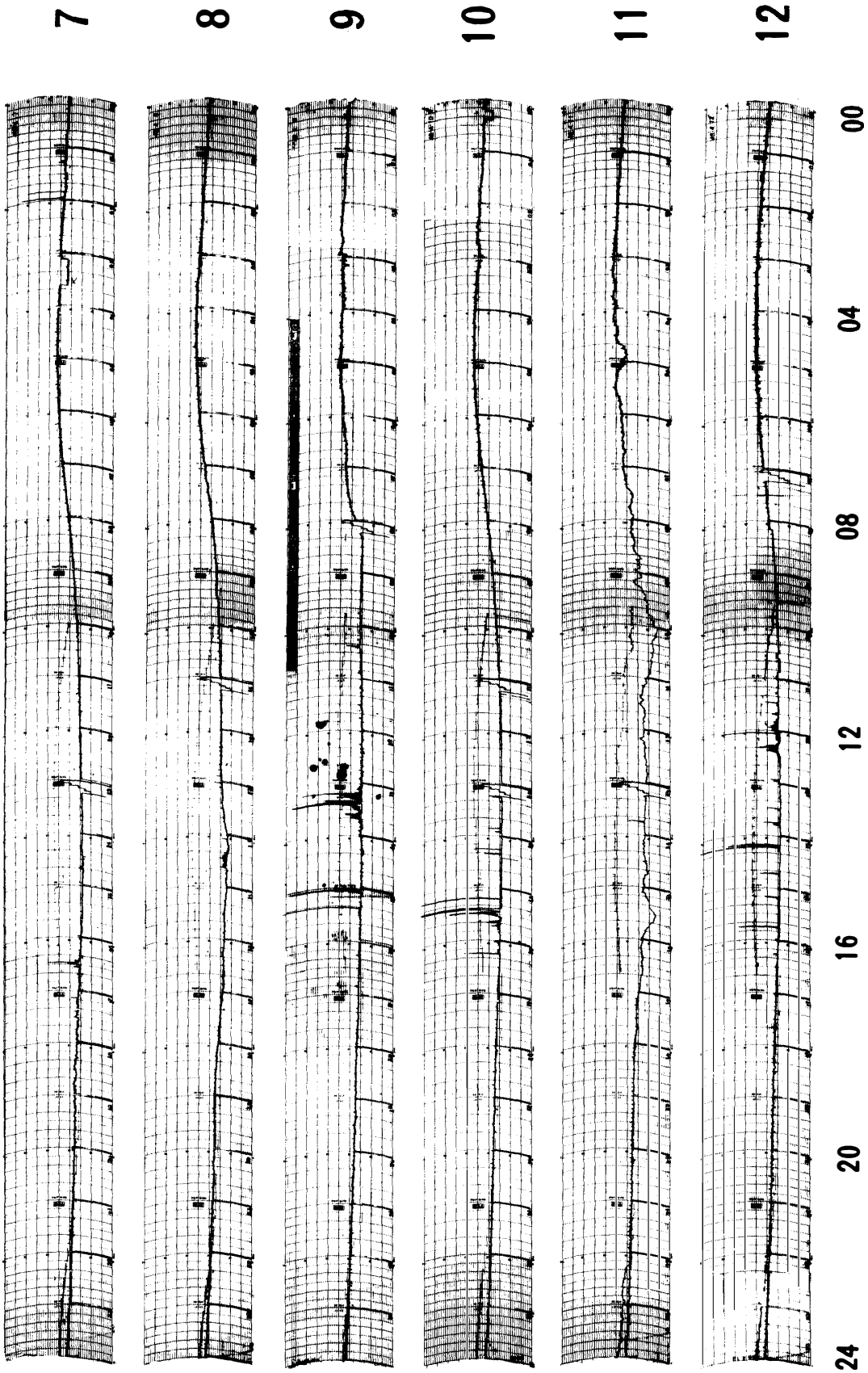

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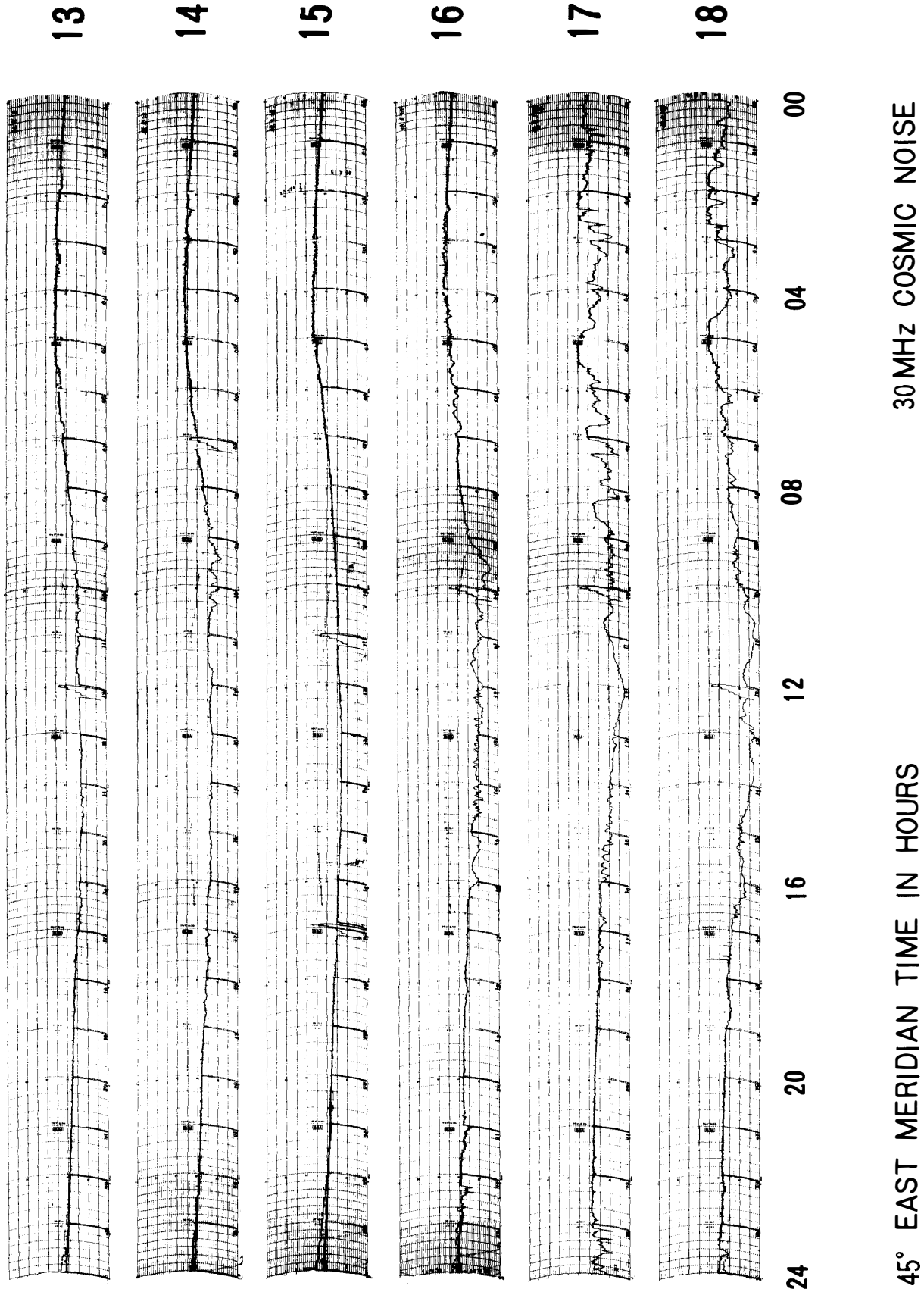
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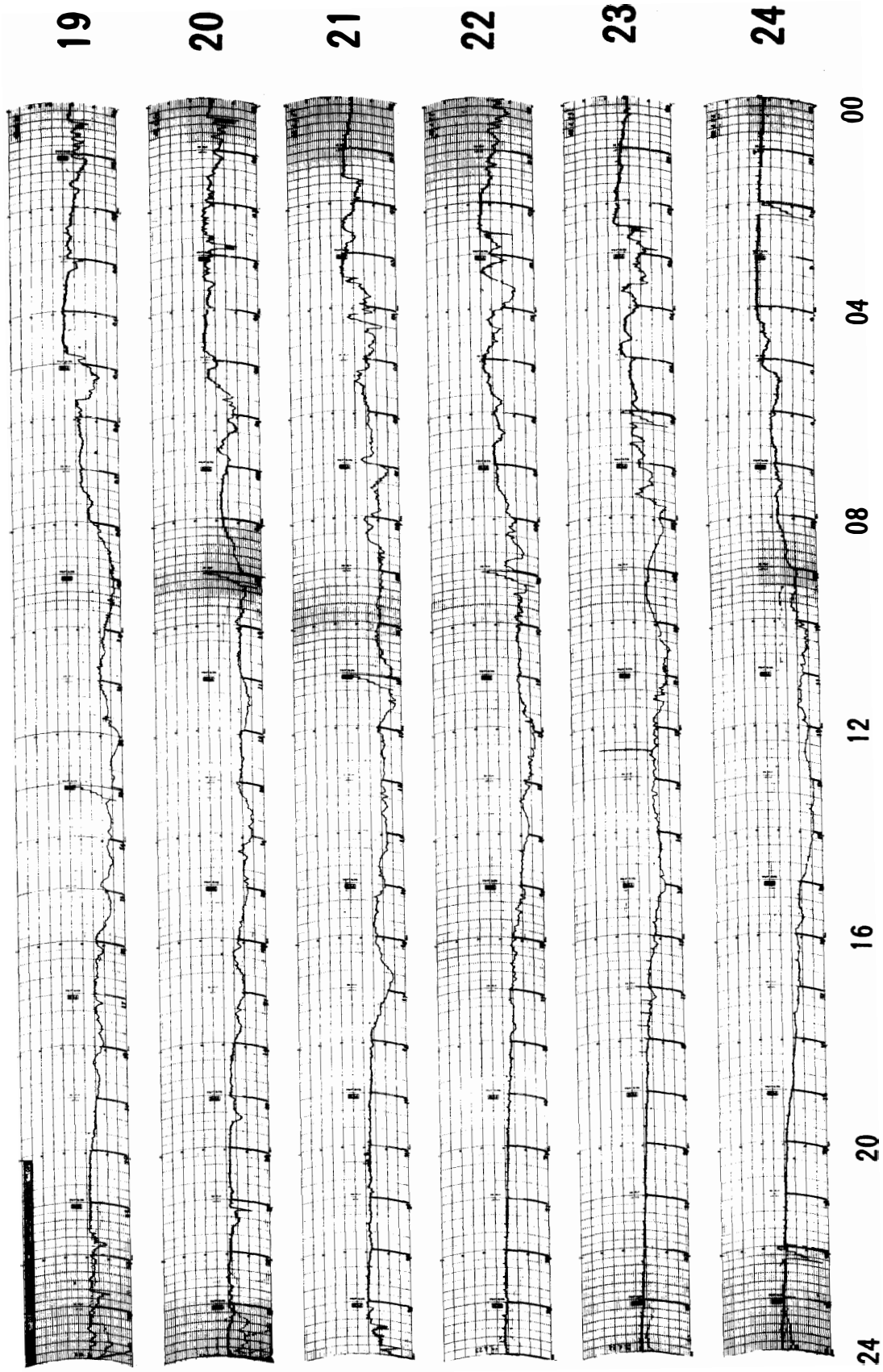

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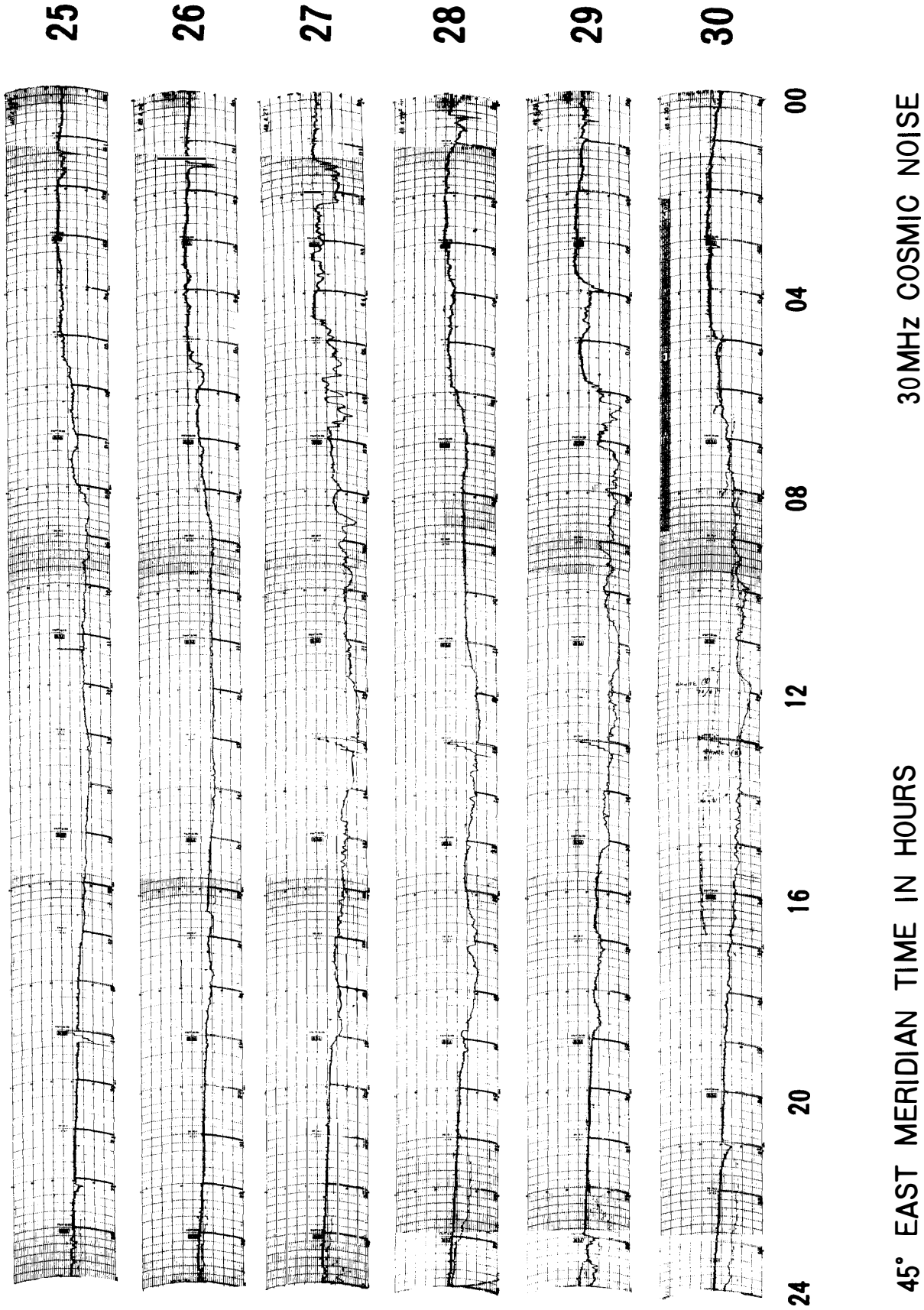
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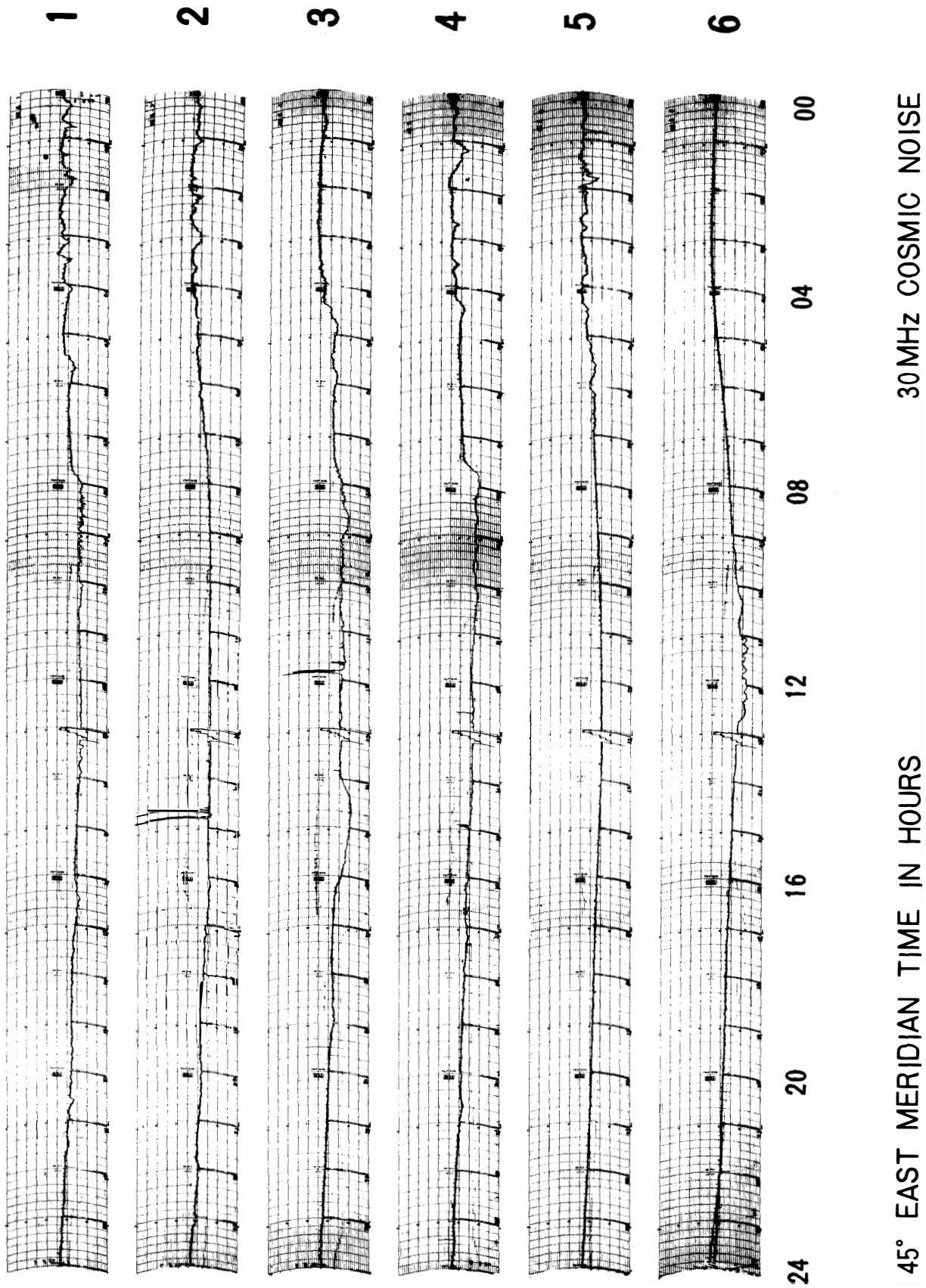
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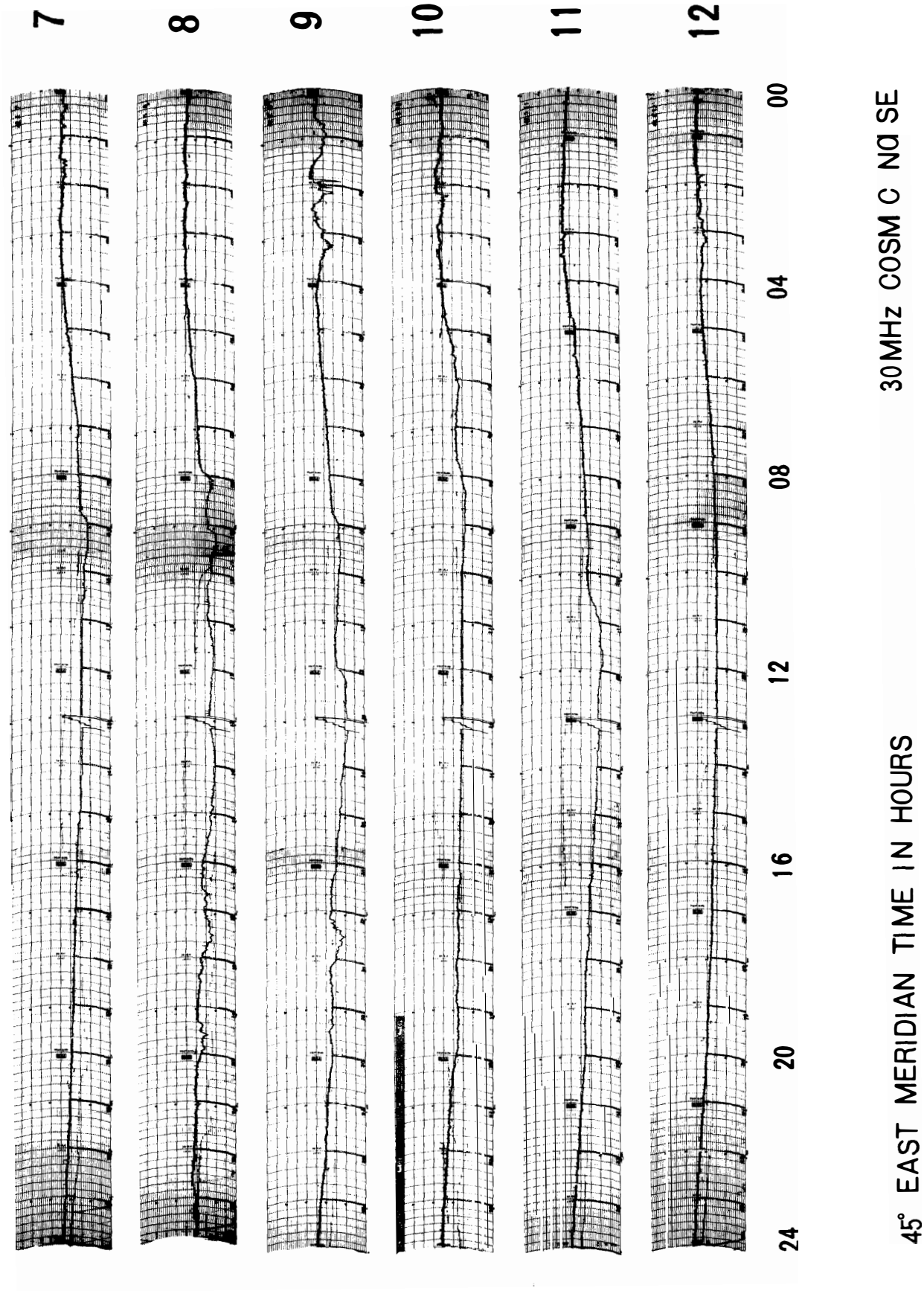
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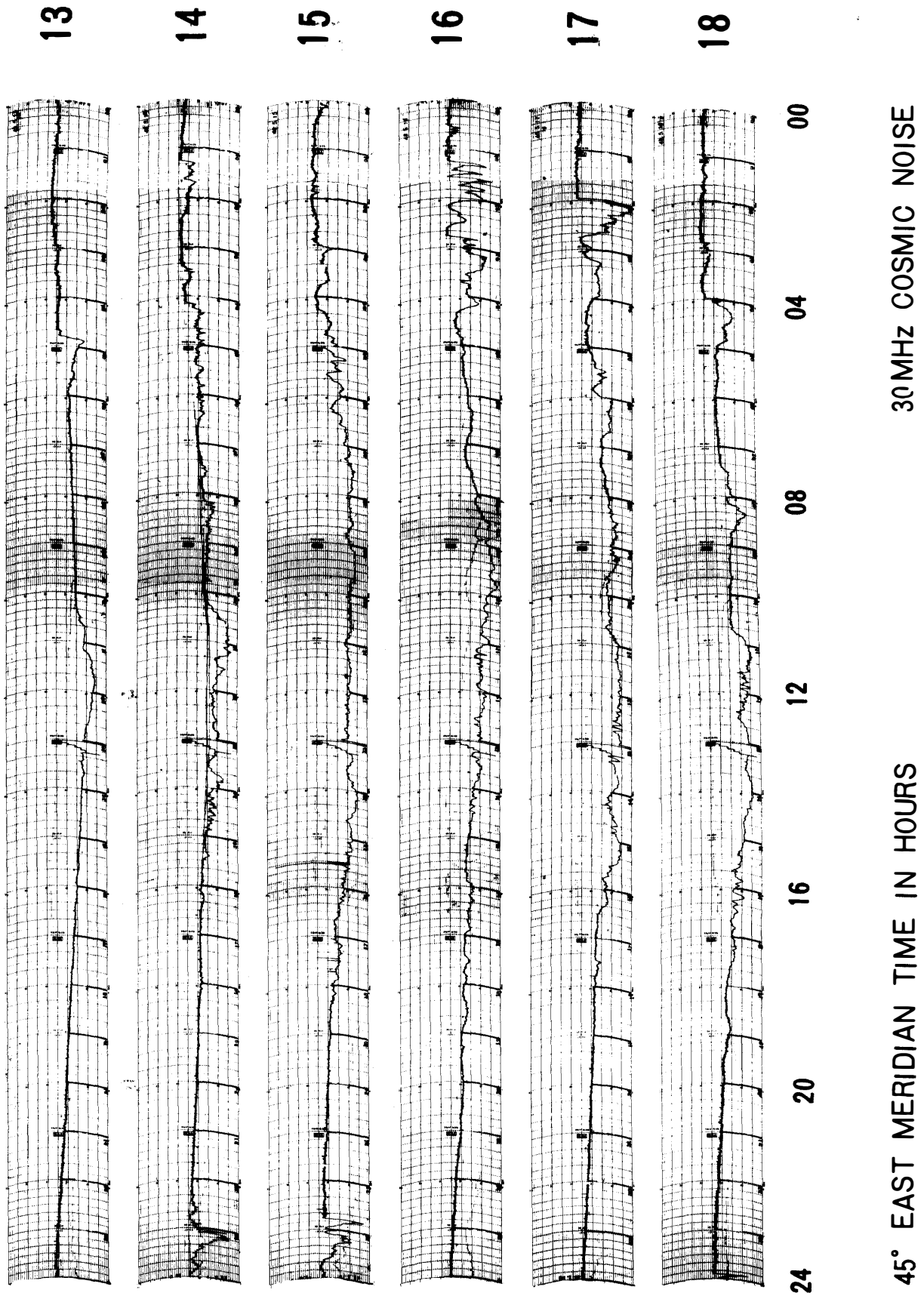
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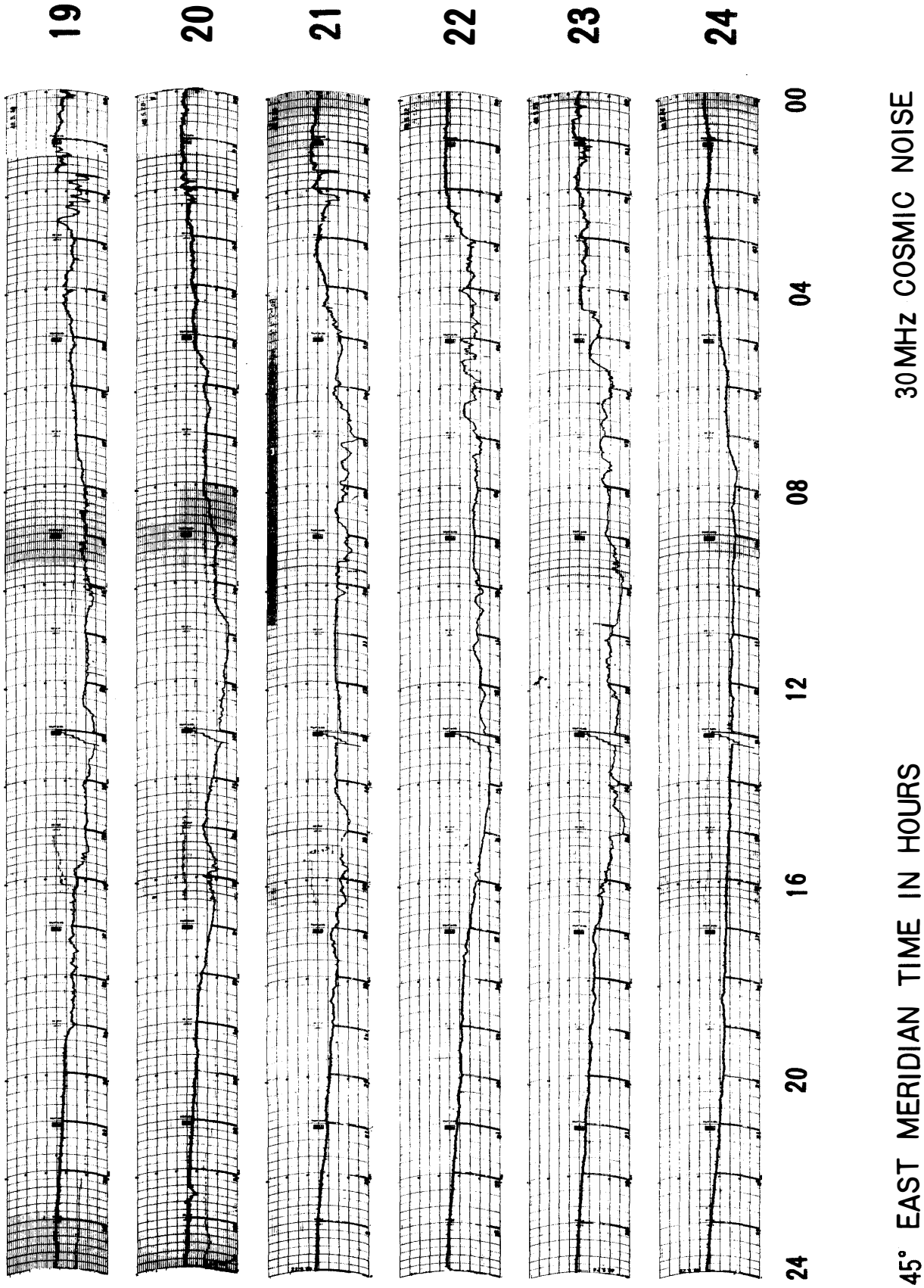
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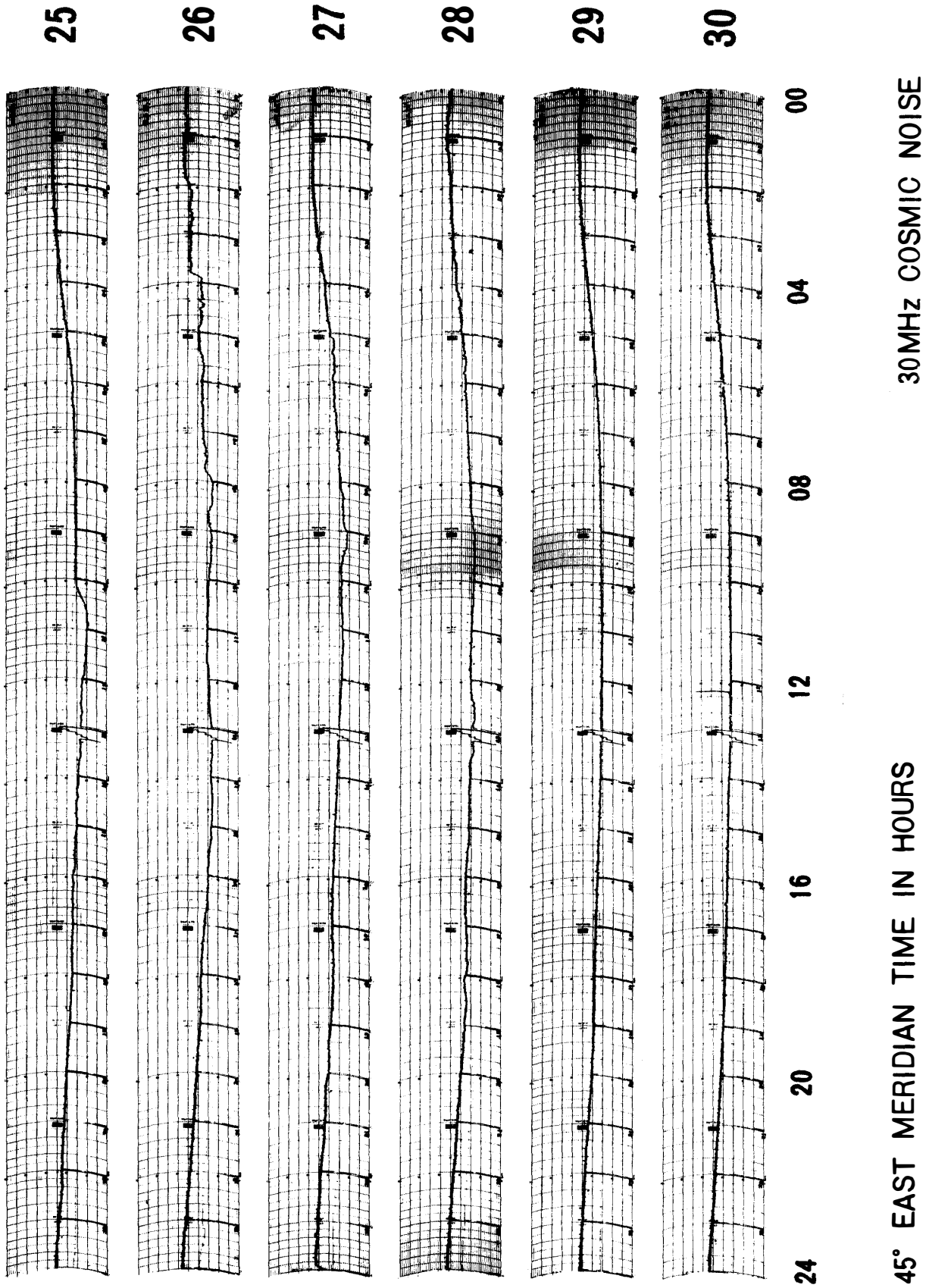
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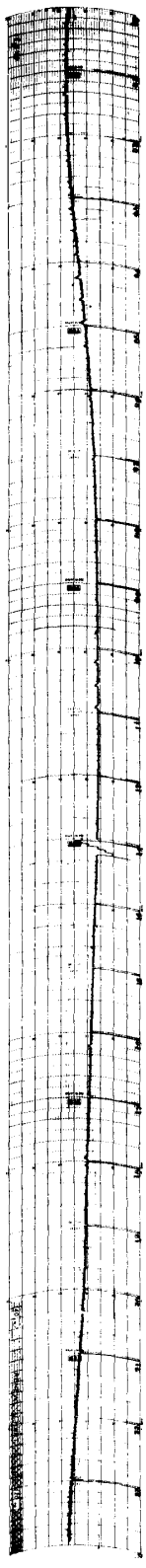

30 MHz COSMIC NOISE

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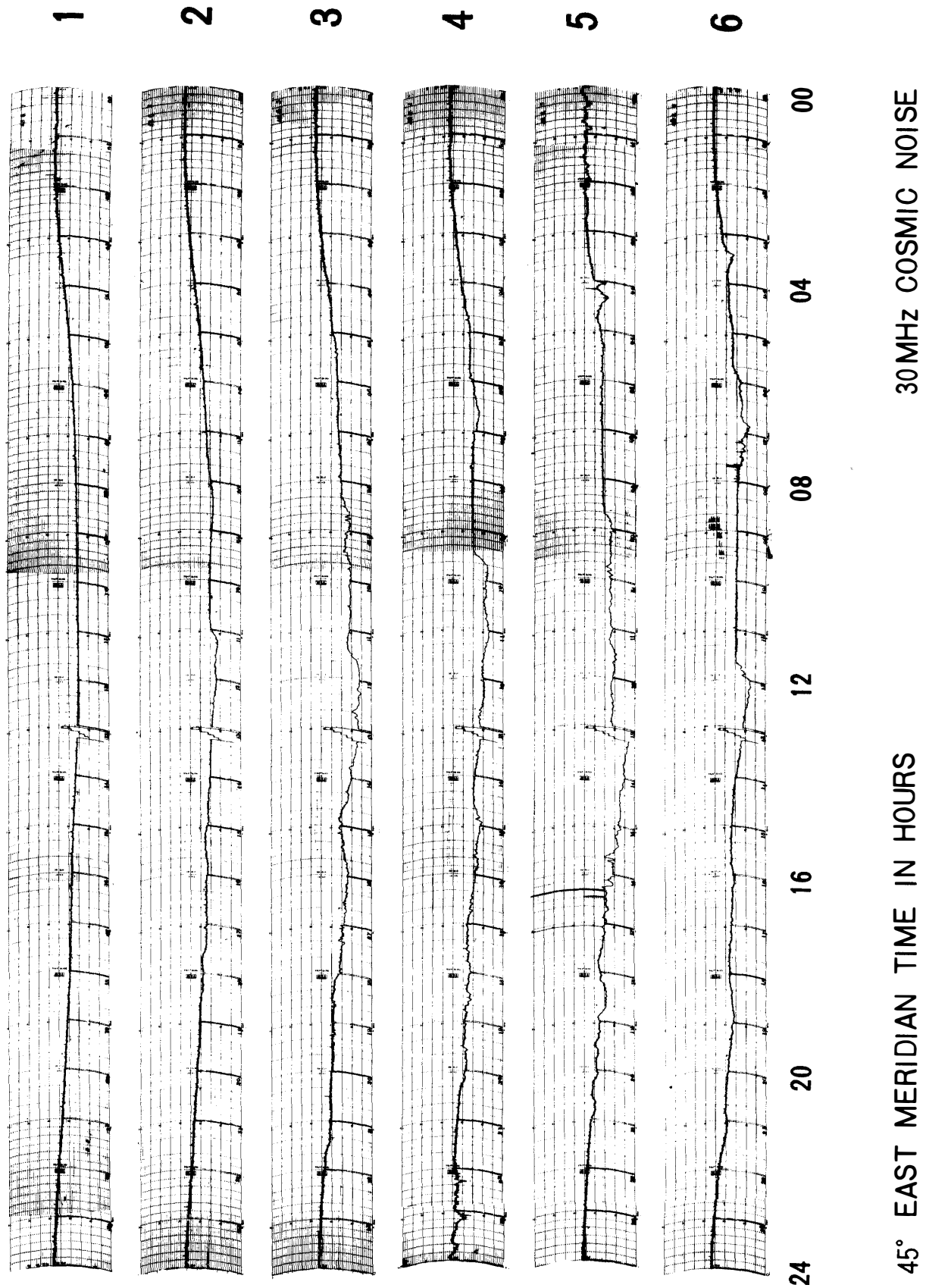
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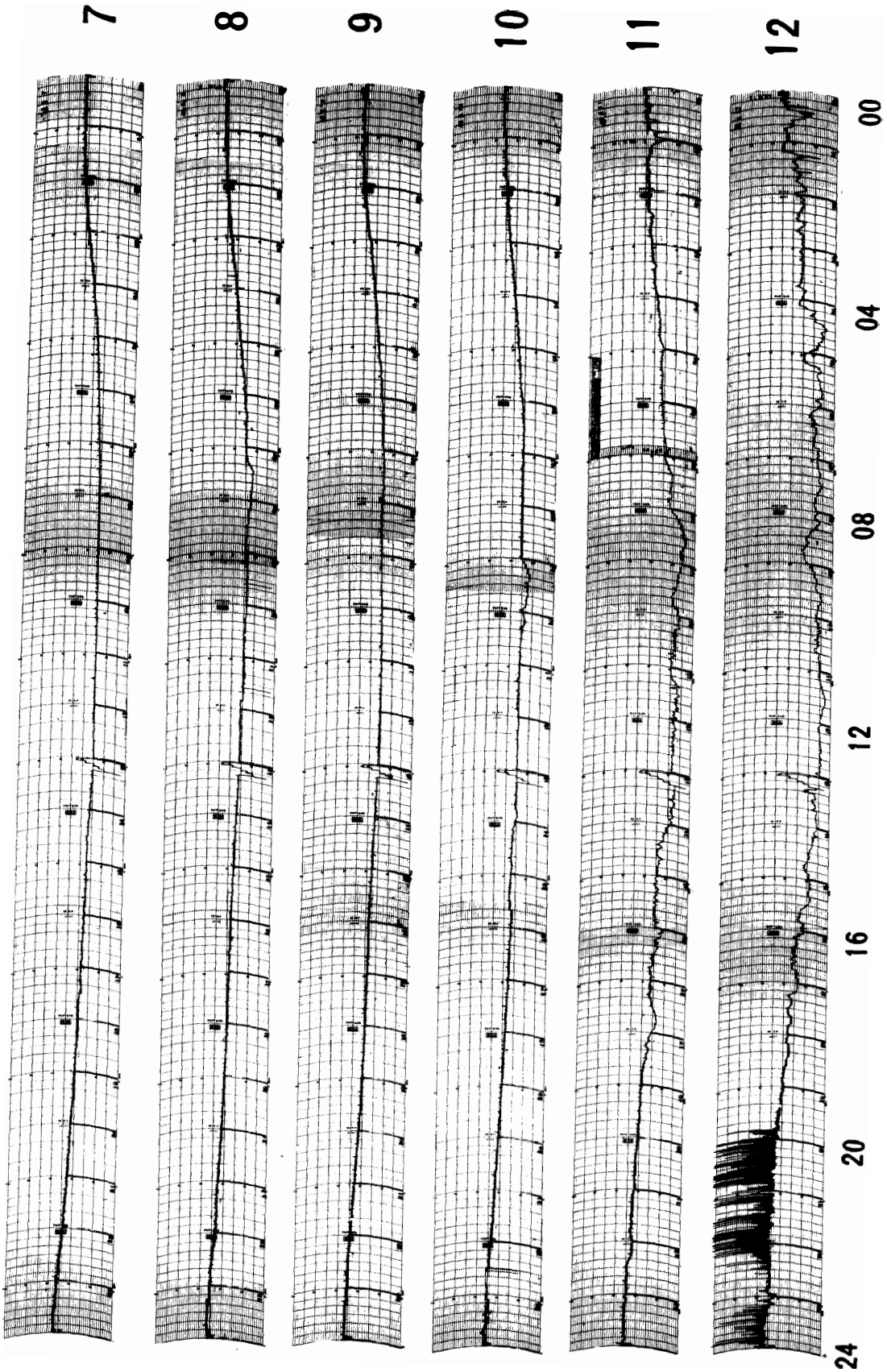

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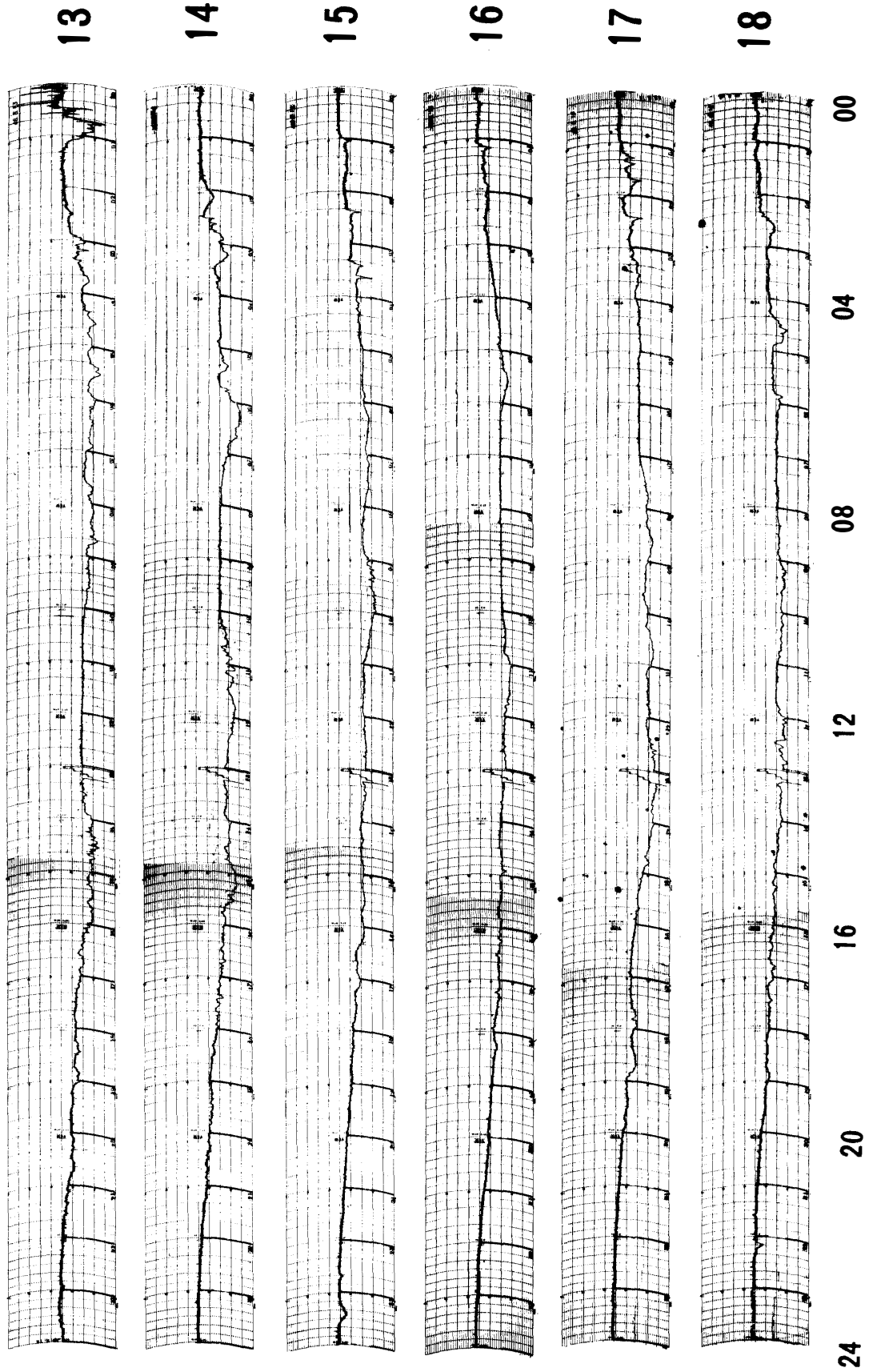

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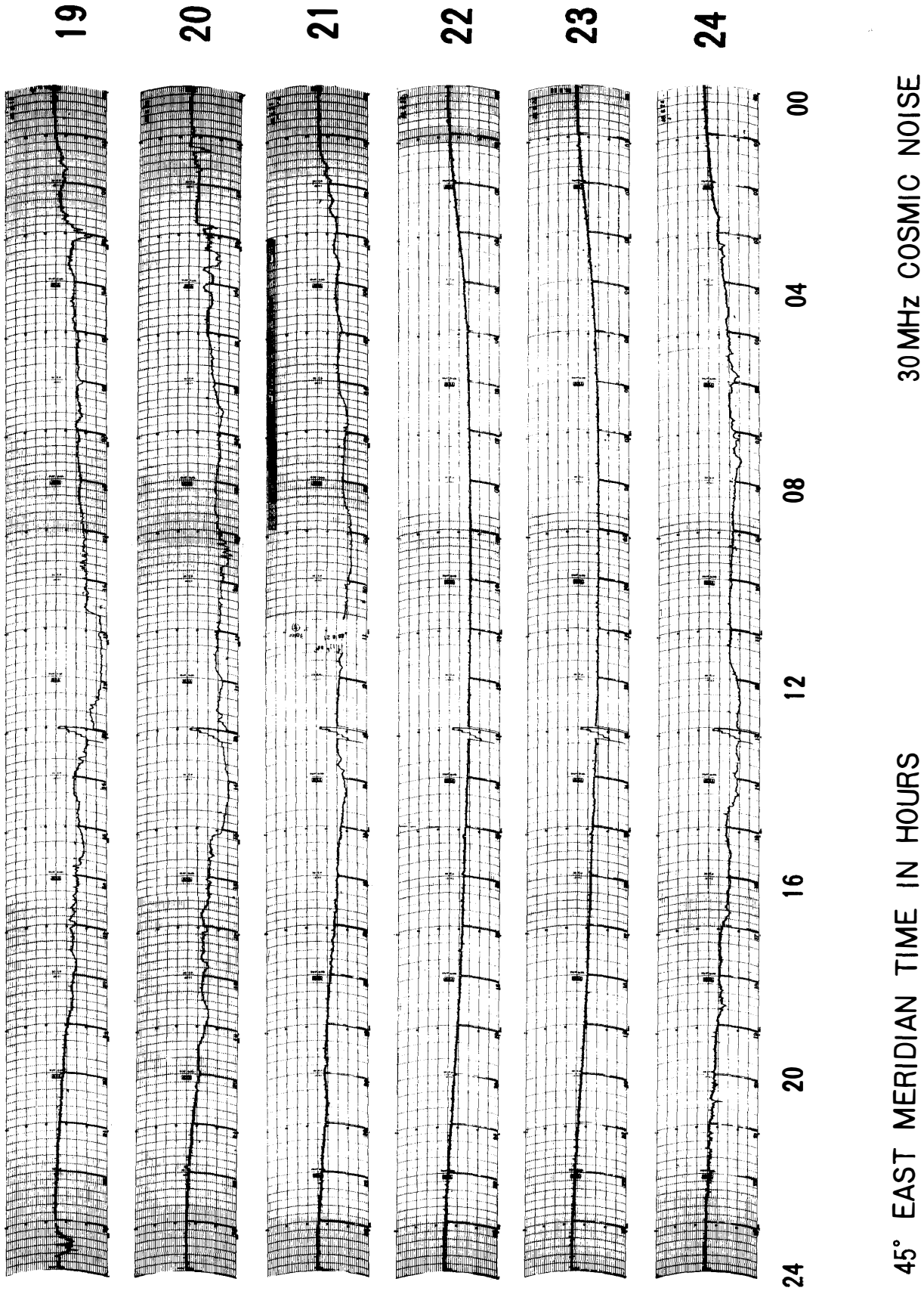
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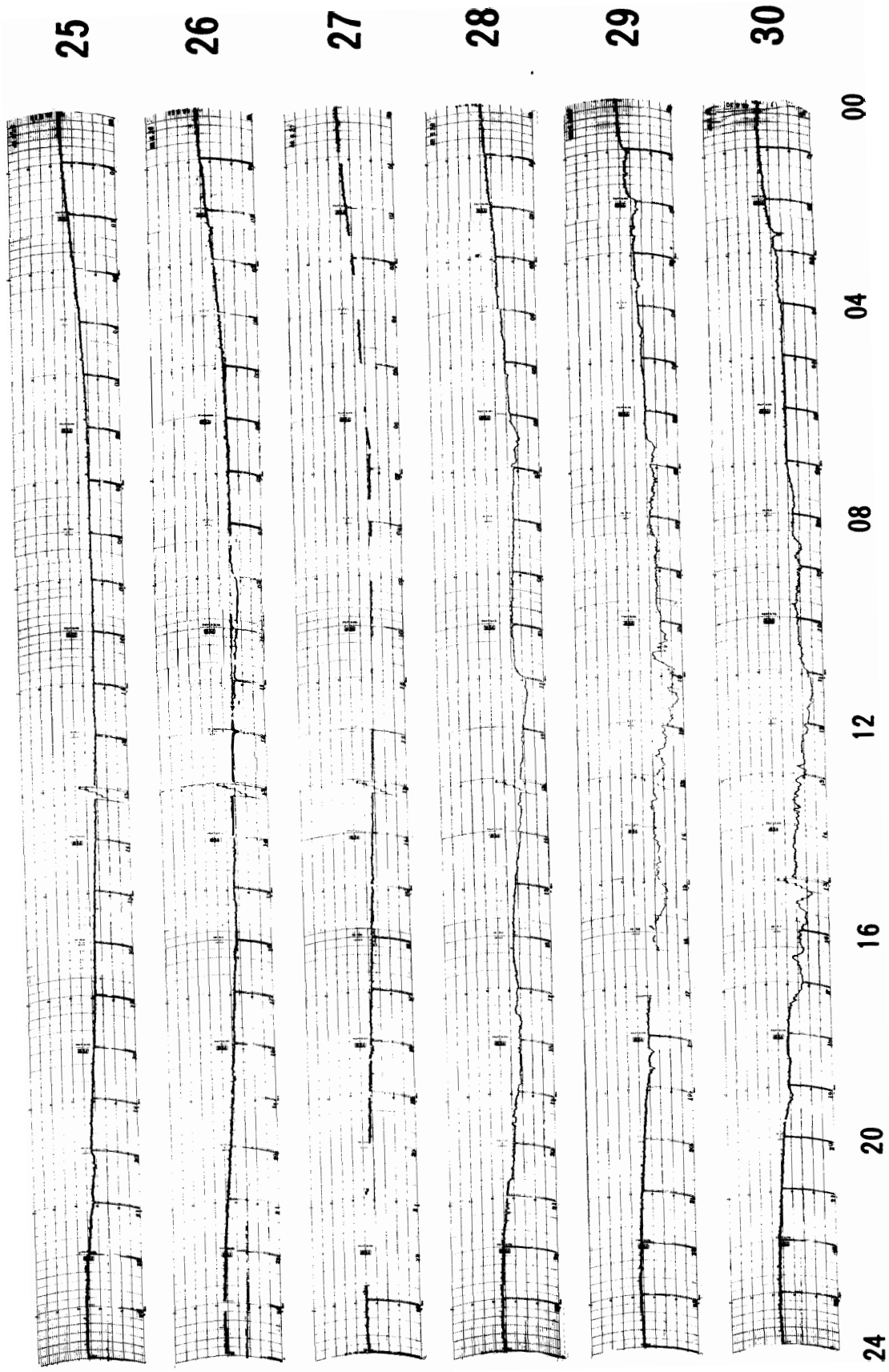


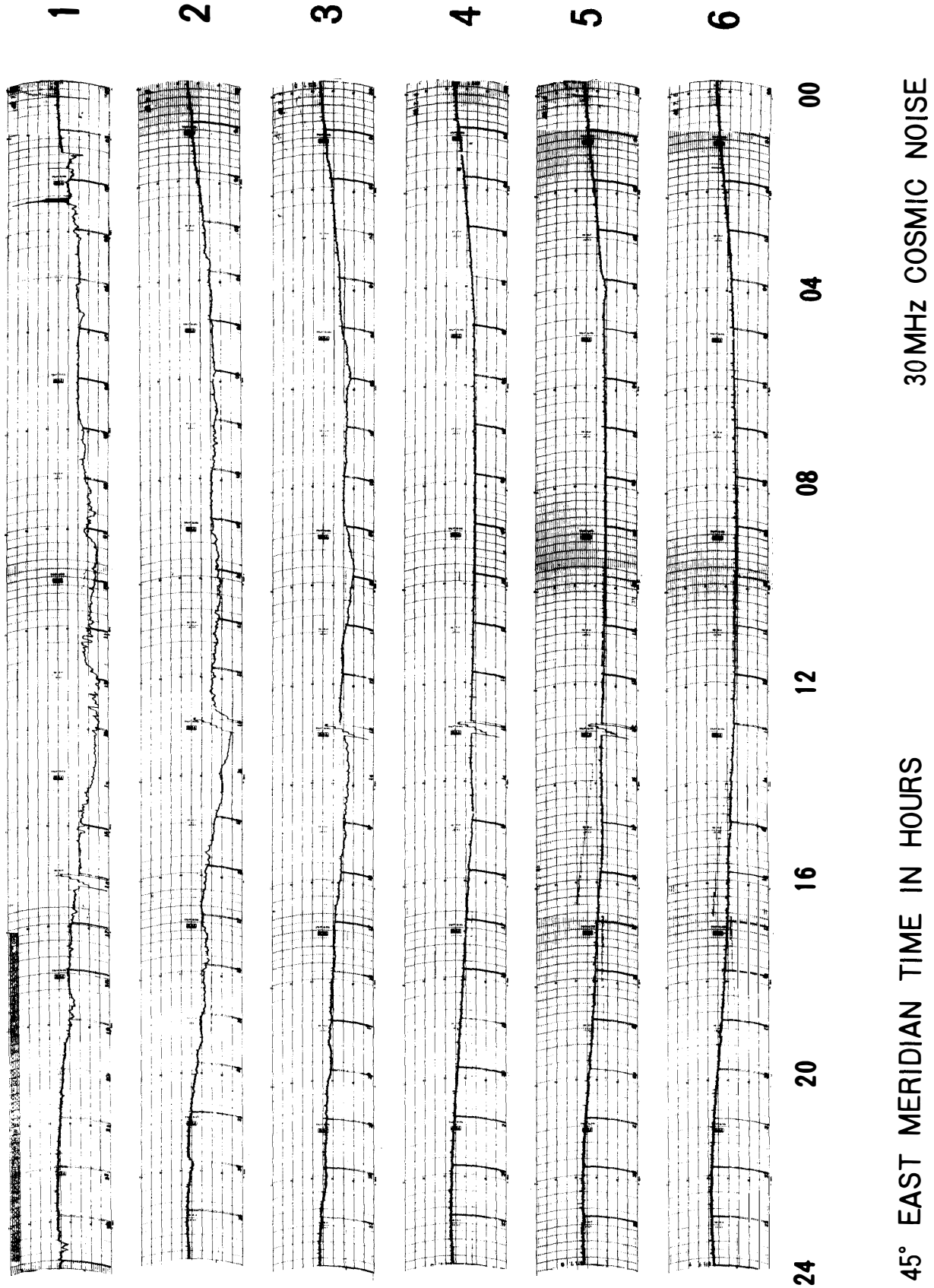
30 MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

Cosmic noise level obscured or equipment malfunction.

10th.	2230-2300	failure of equipment.
21th.	1050-1130	〃
26th.	1120-1150	〃
27th.	0320-1200	〃
	2000-2240	〃
29th.	1620-1715	〃

JULY 1973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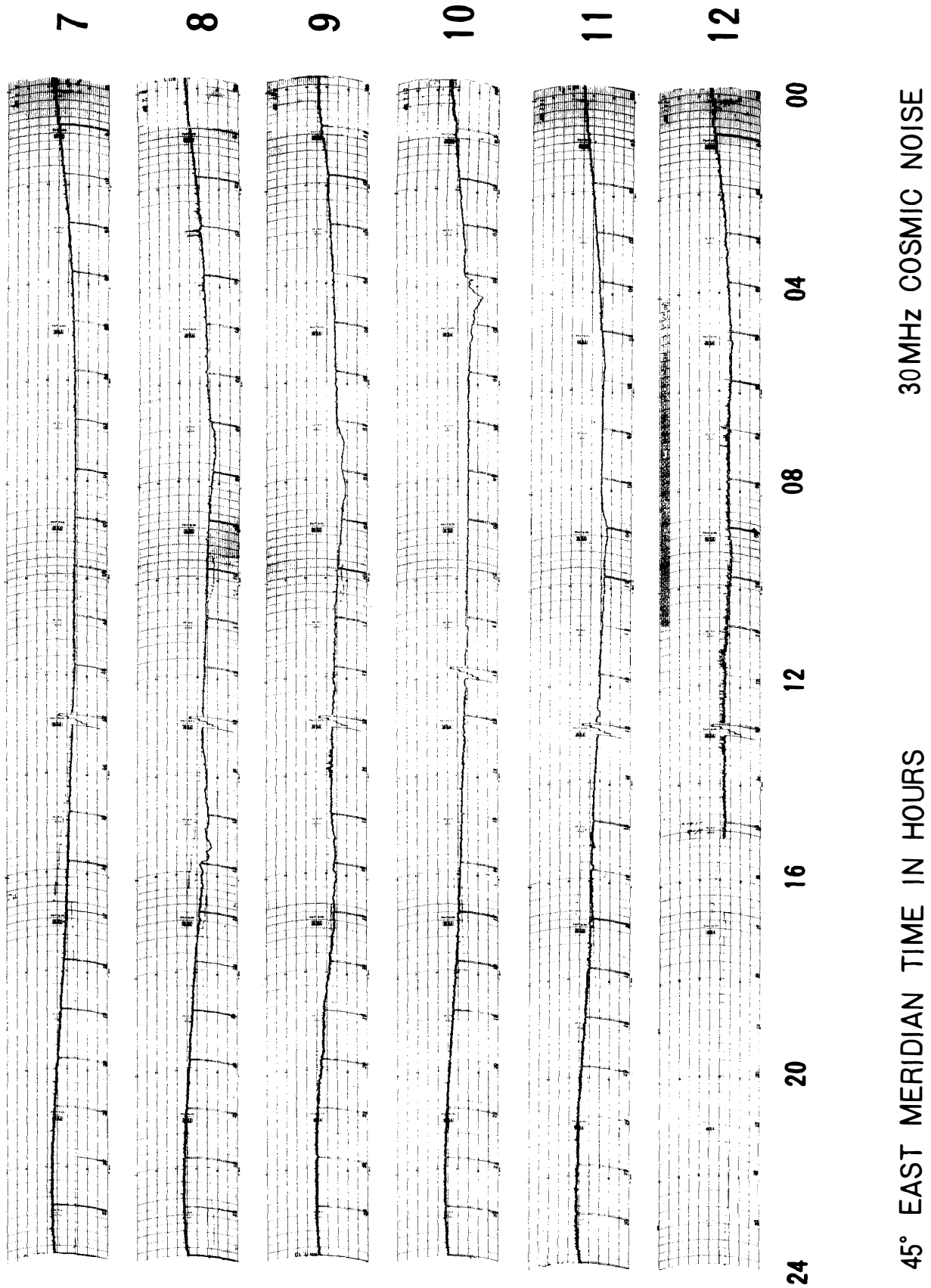
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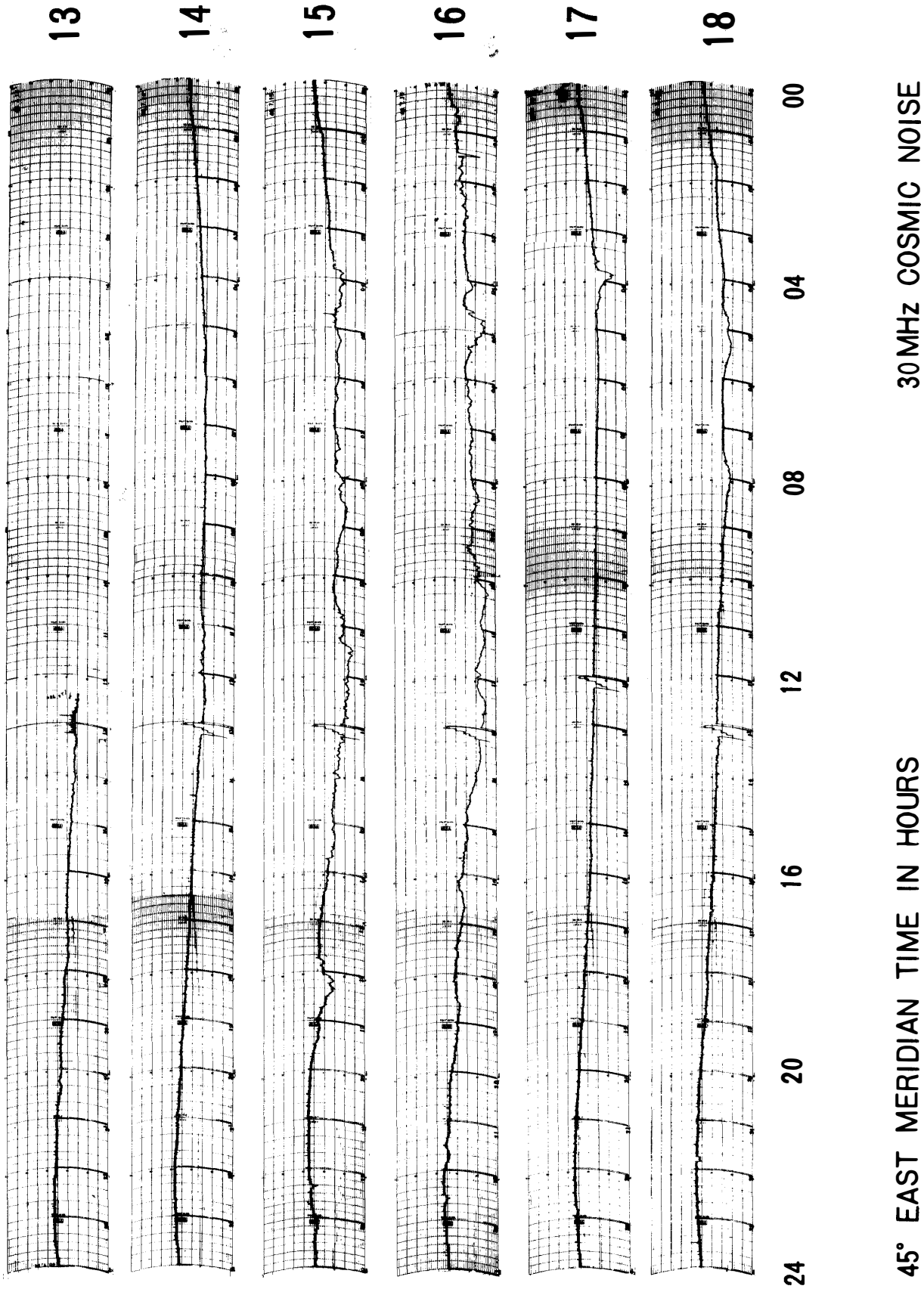
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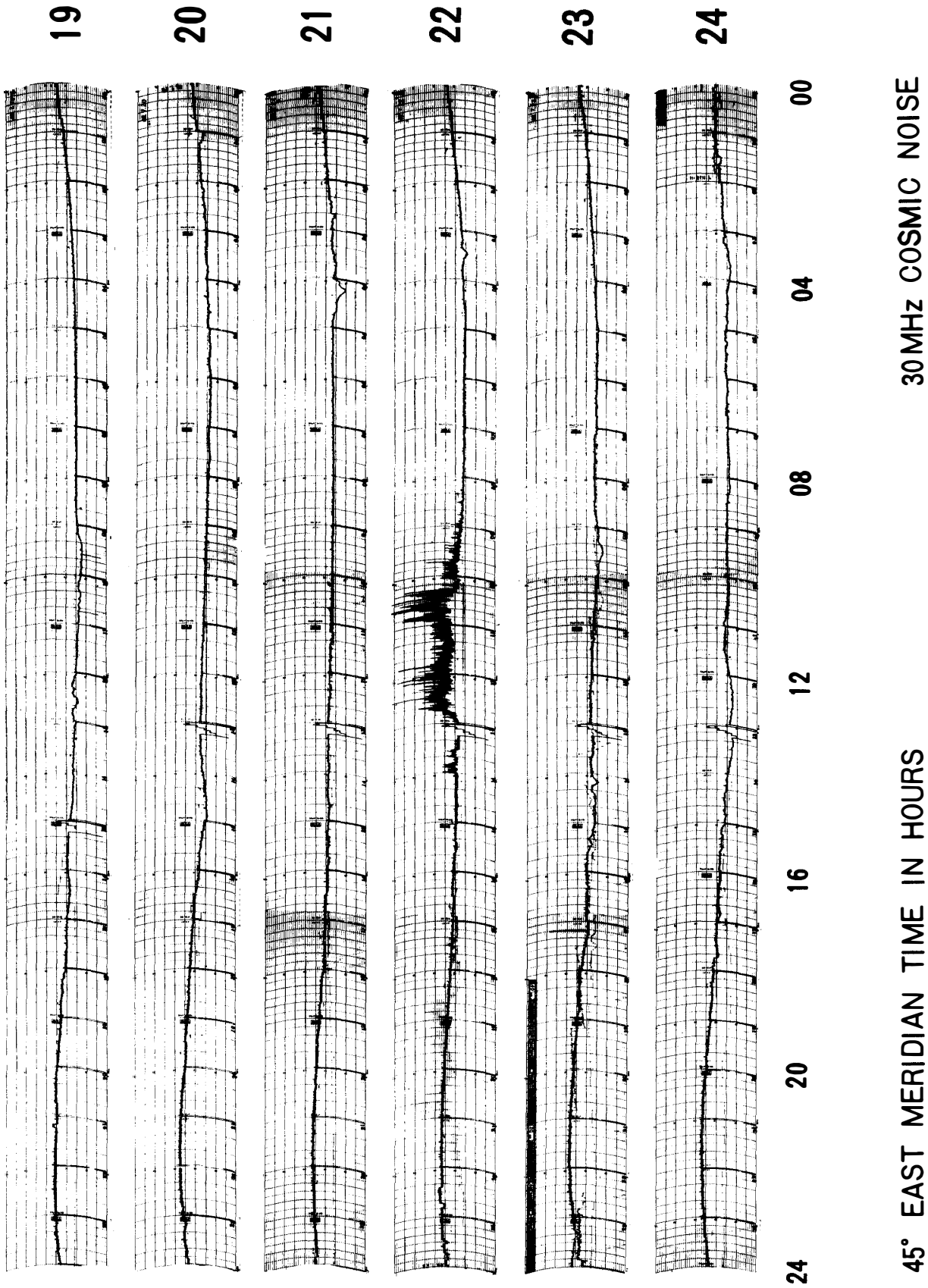
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

JULY 1973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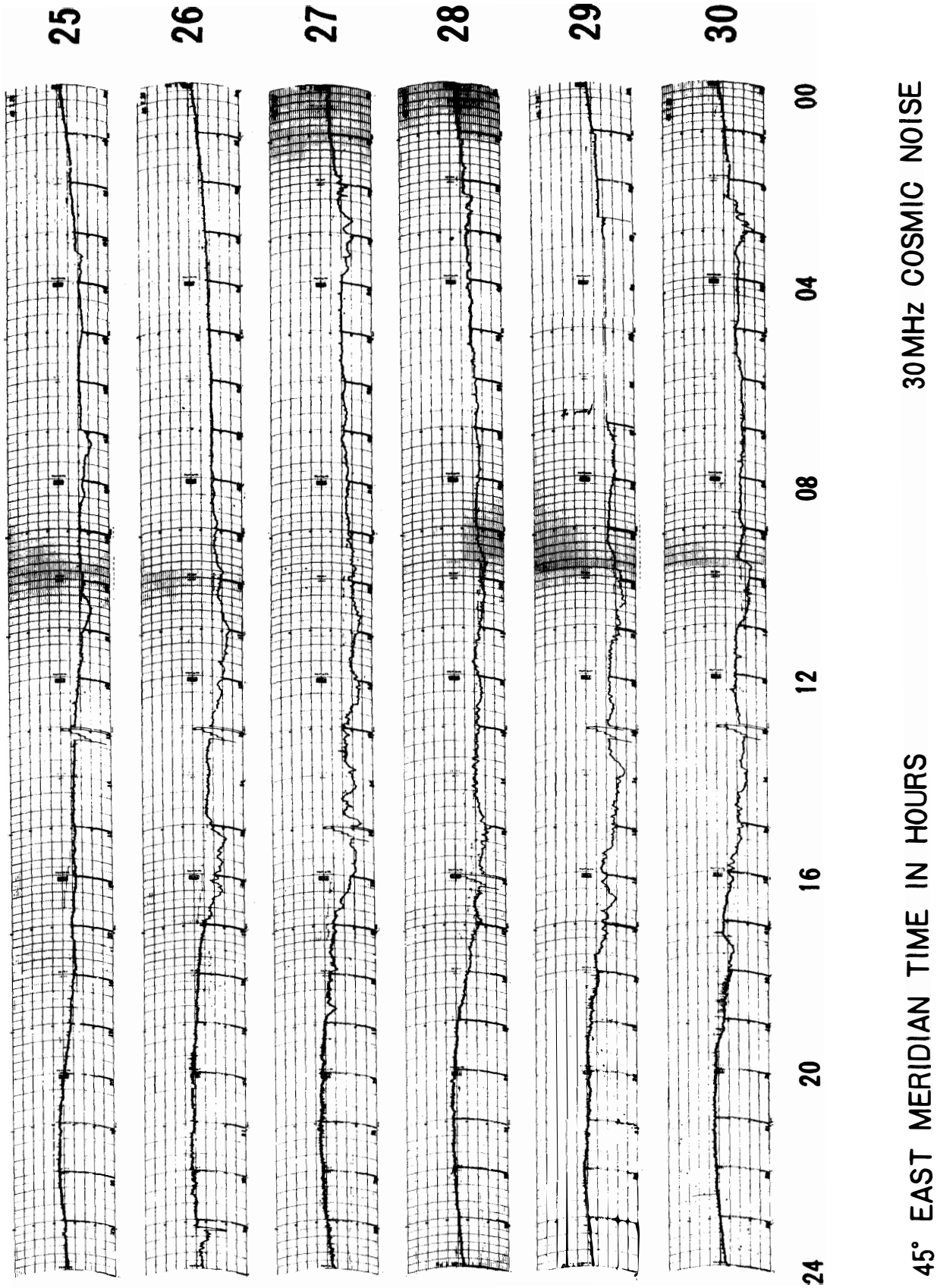
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

JULY 1973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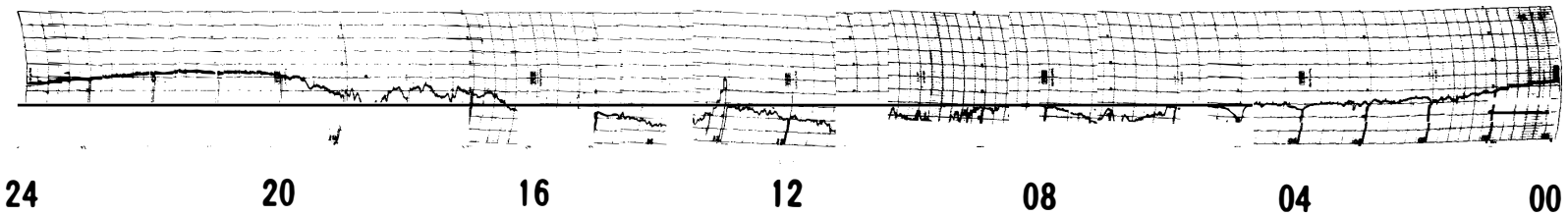
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS



31

JULY 1973

45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

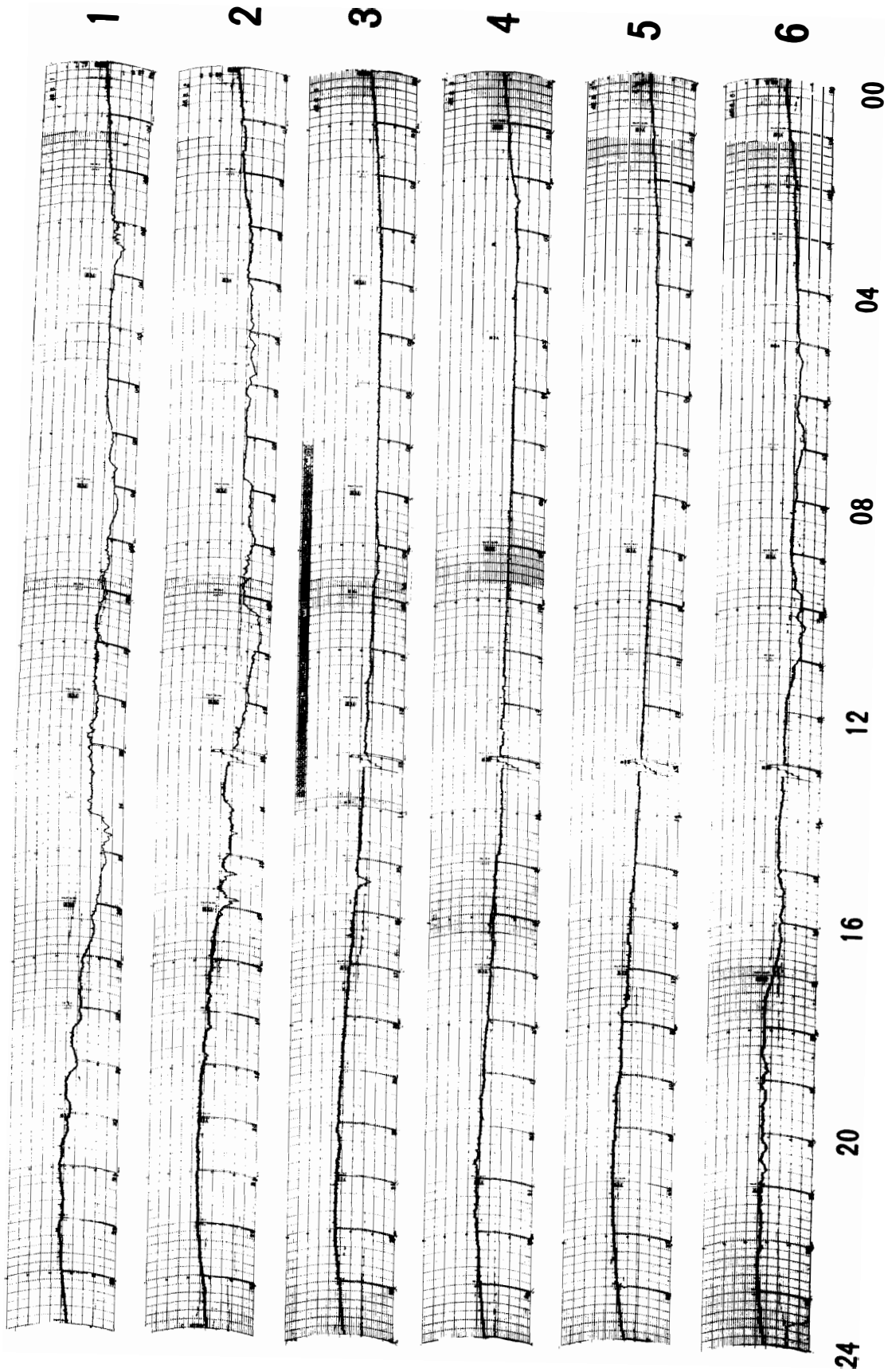
Cosmic noise level obscured or equipment malfunction.

12th. 1520-

13th. -1230 failure of equipment.

29th. 0240-0700 "

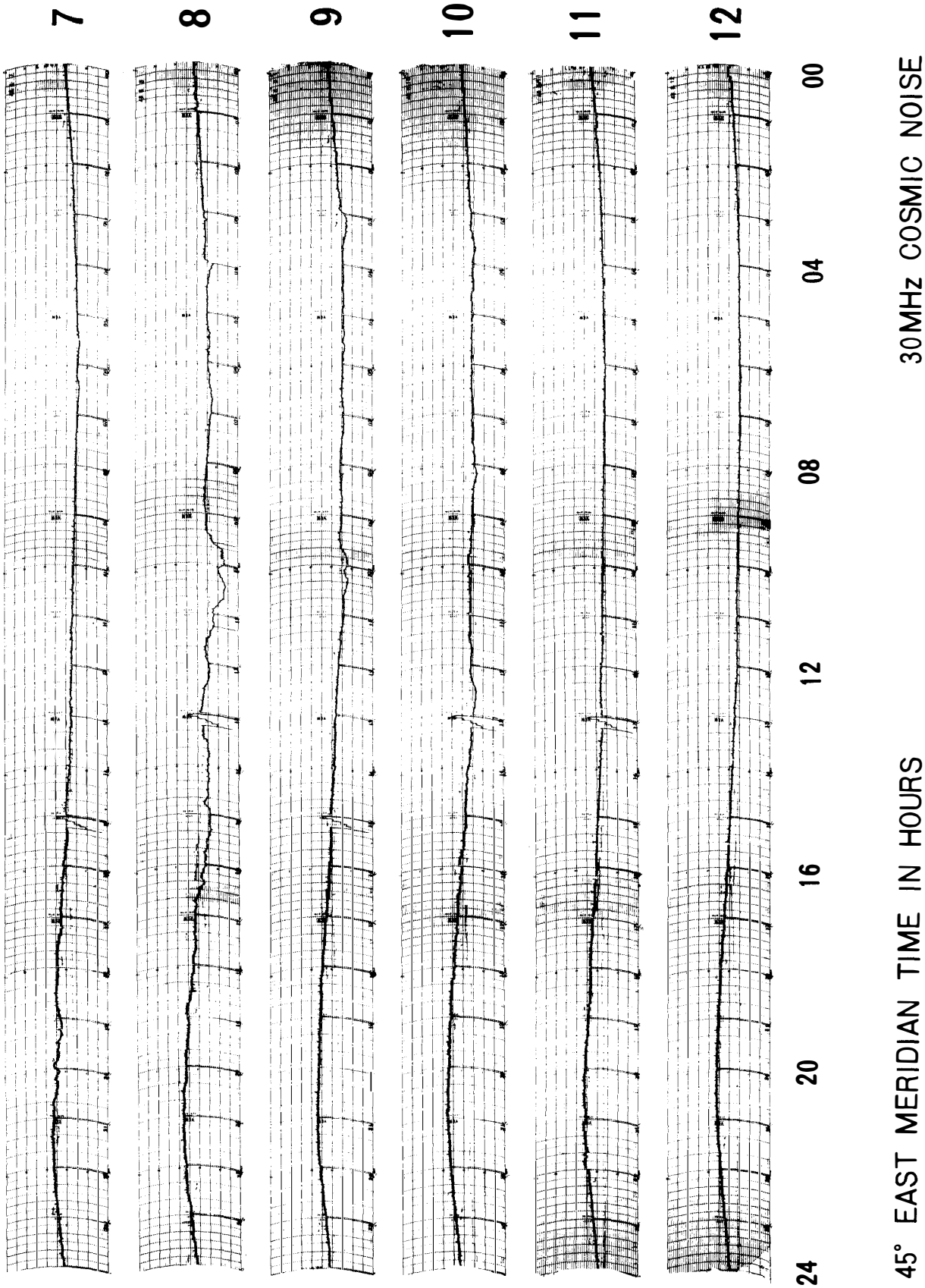
AUG 1973



30 MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

AUG 1973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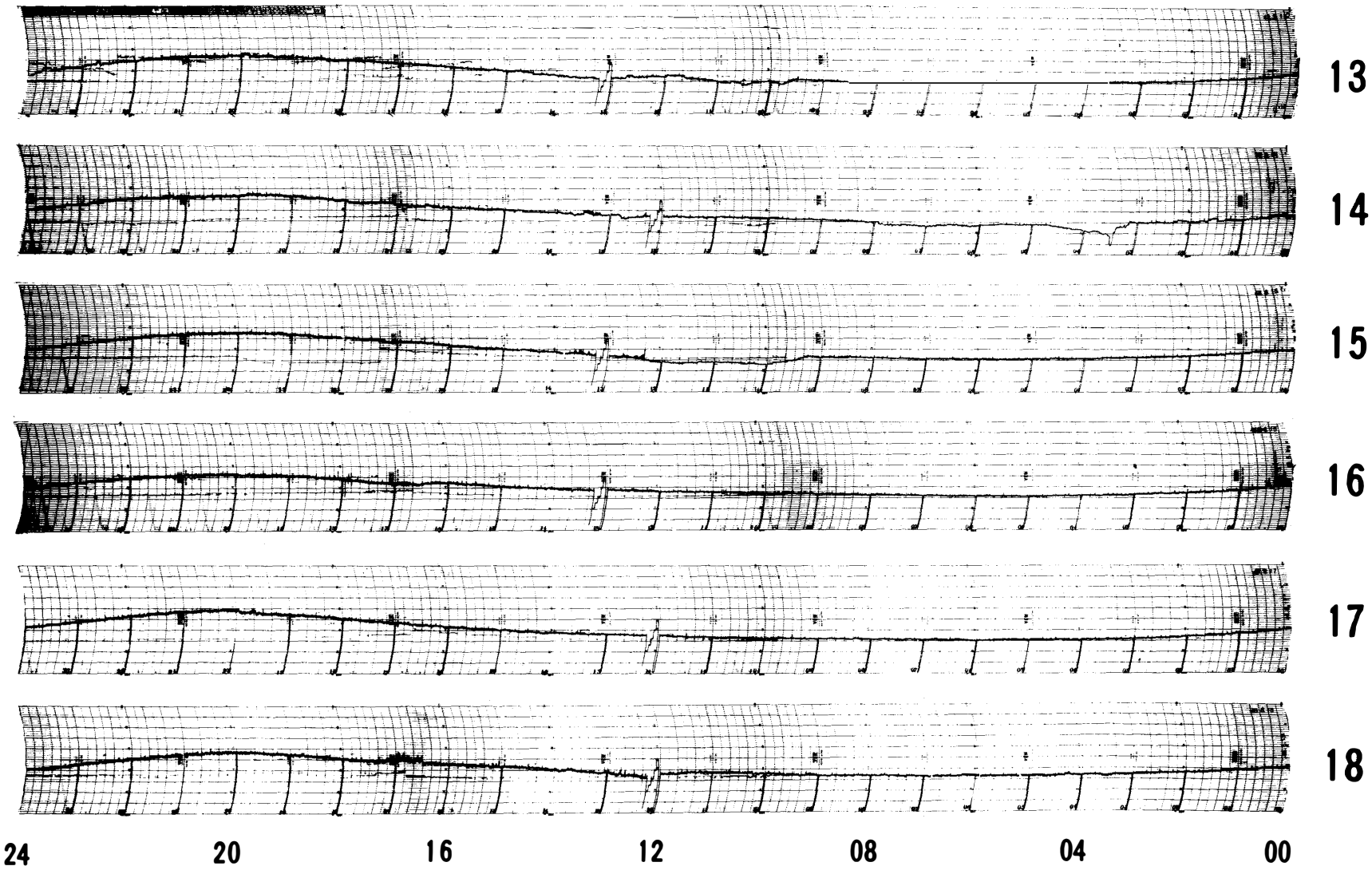
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

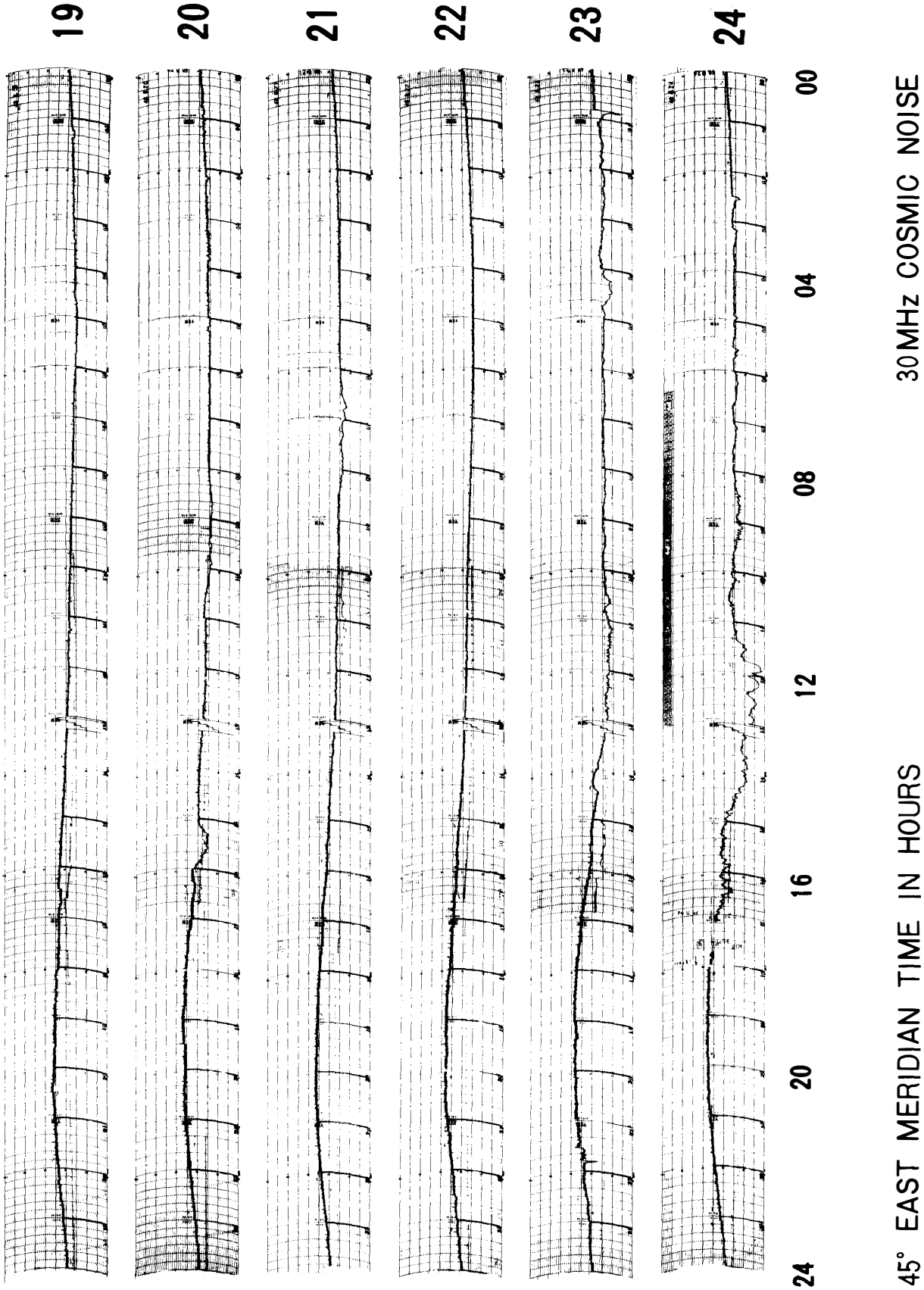
AUG 1973



45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

AUG 1973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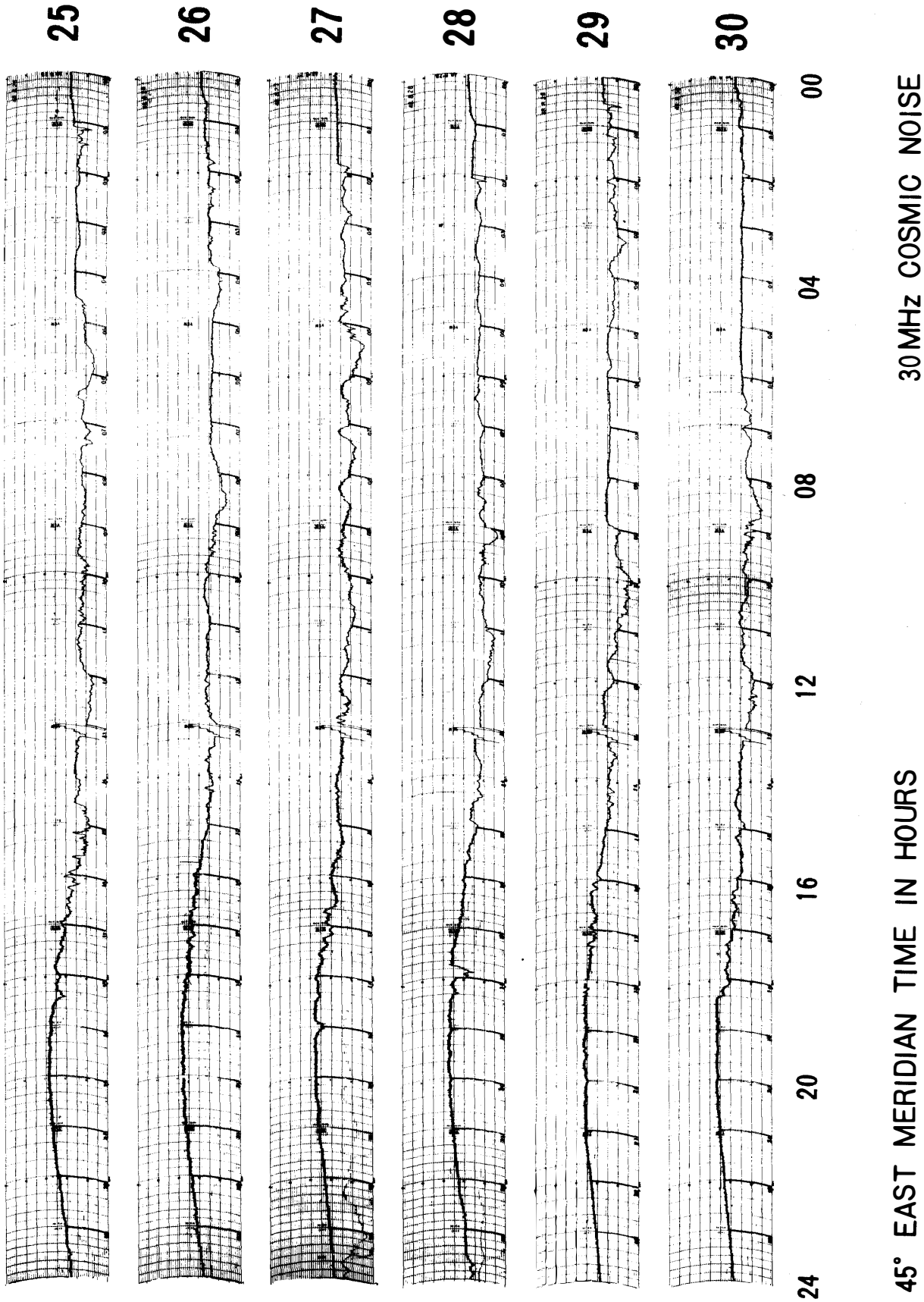
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

AUG 1973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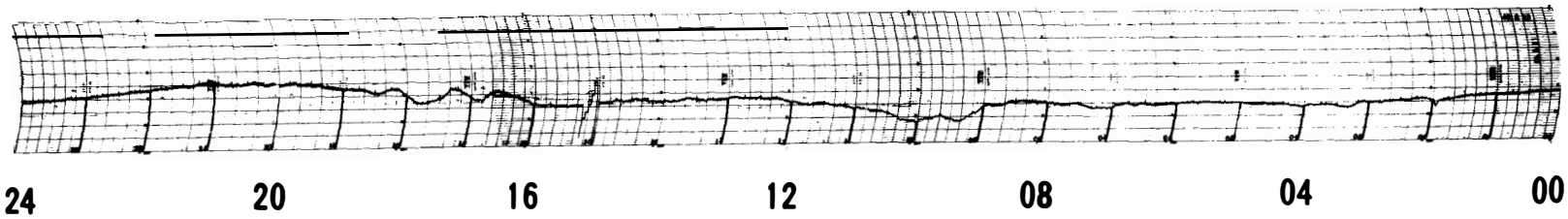
30 MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS



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AUG 1973

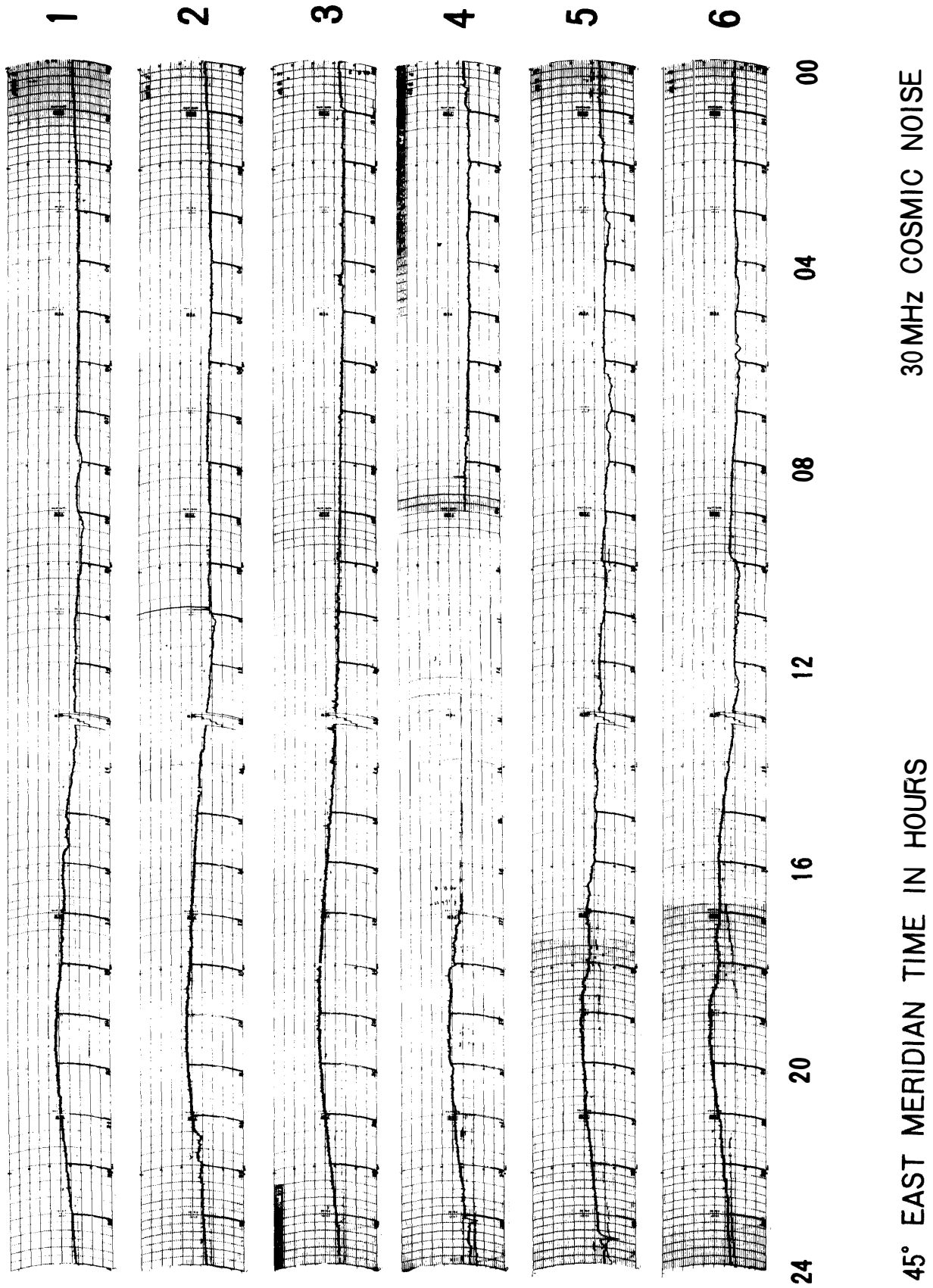
45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

24th. 1700-1740 failure of equipment.

SEP 1973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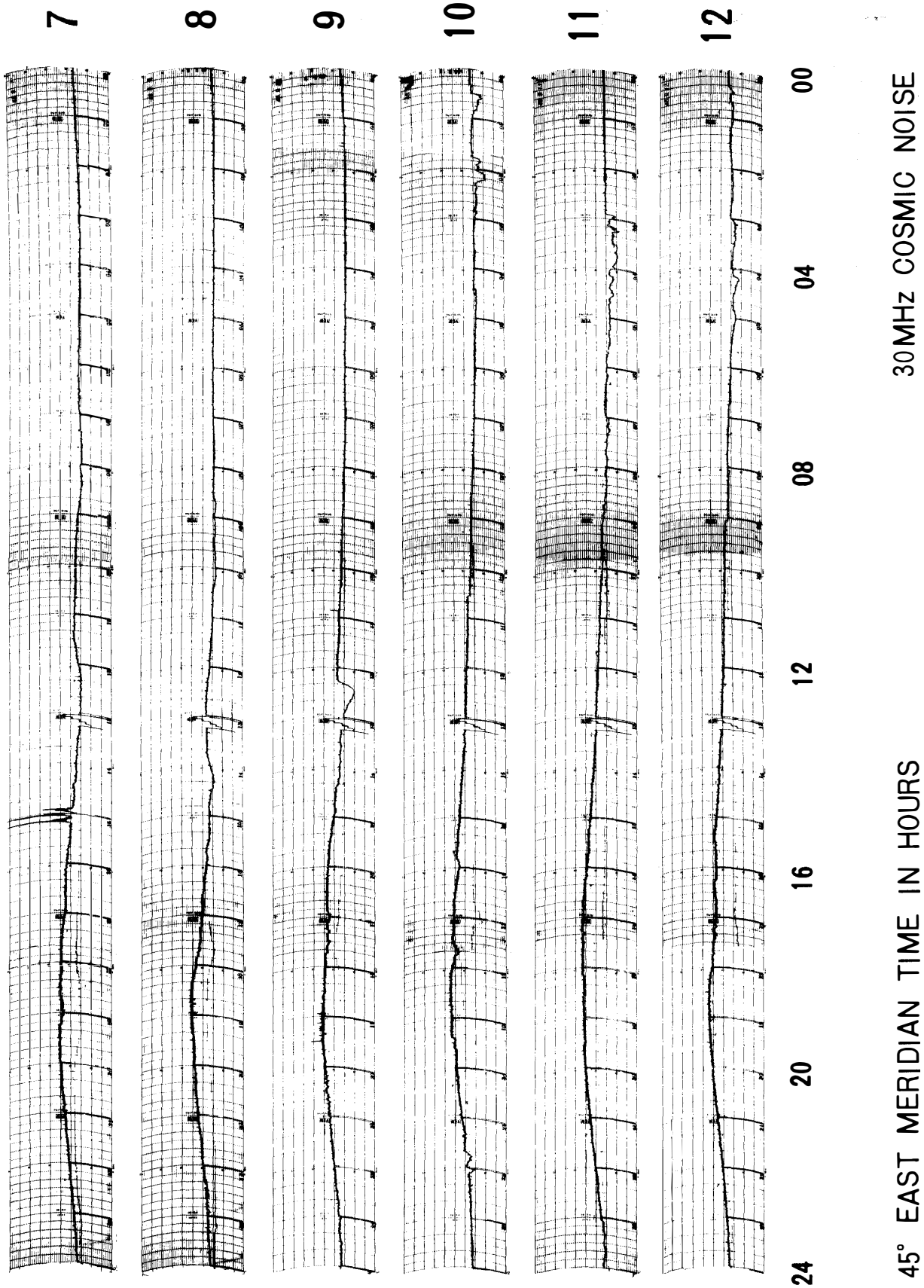
30 MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

SEP 1973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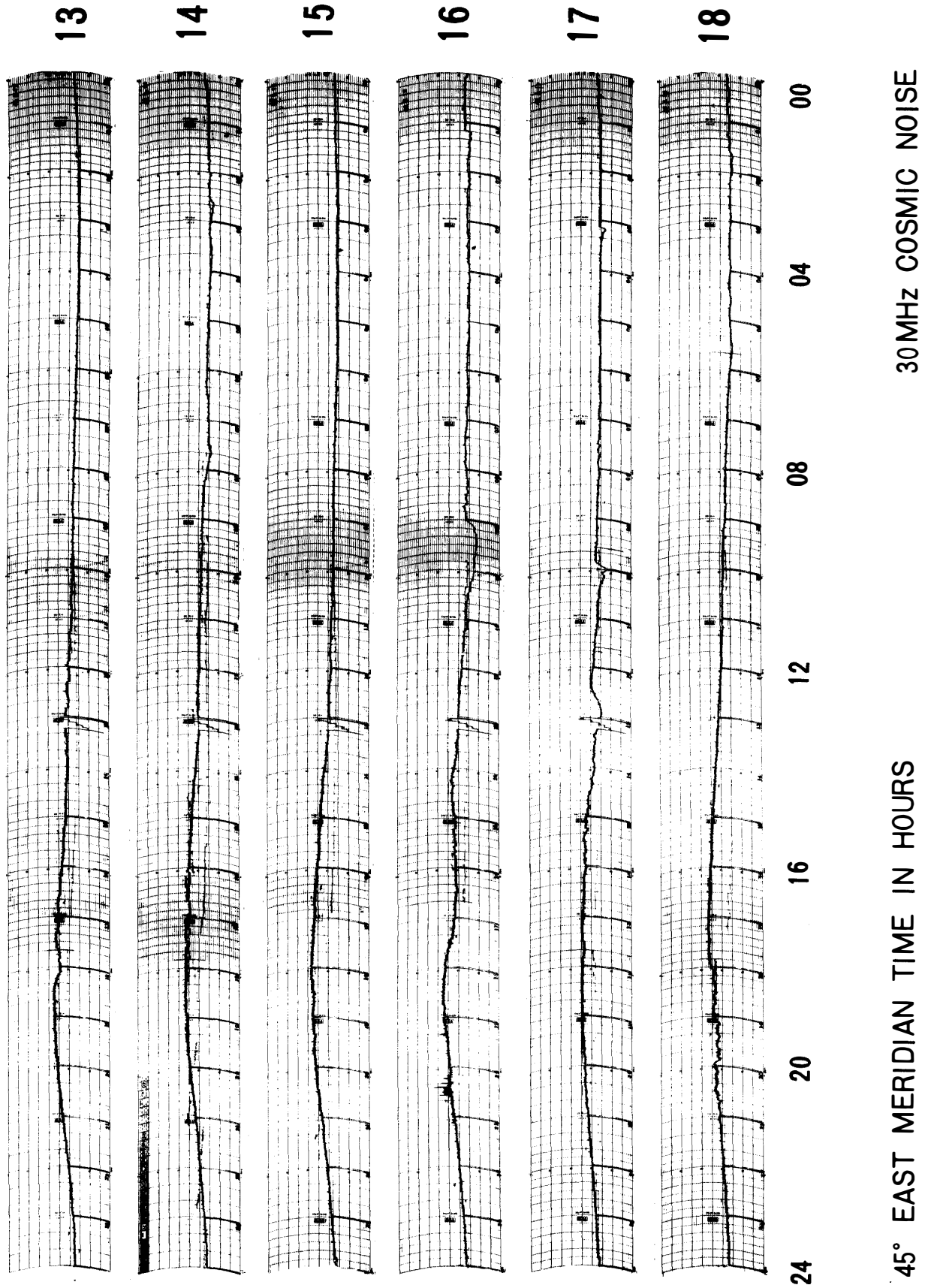
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

SEP 1973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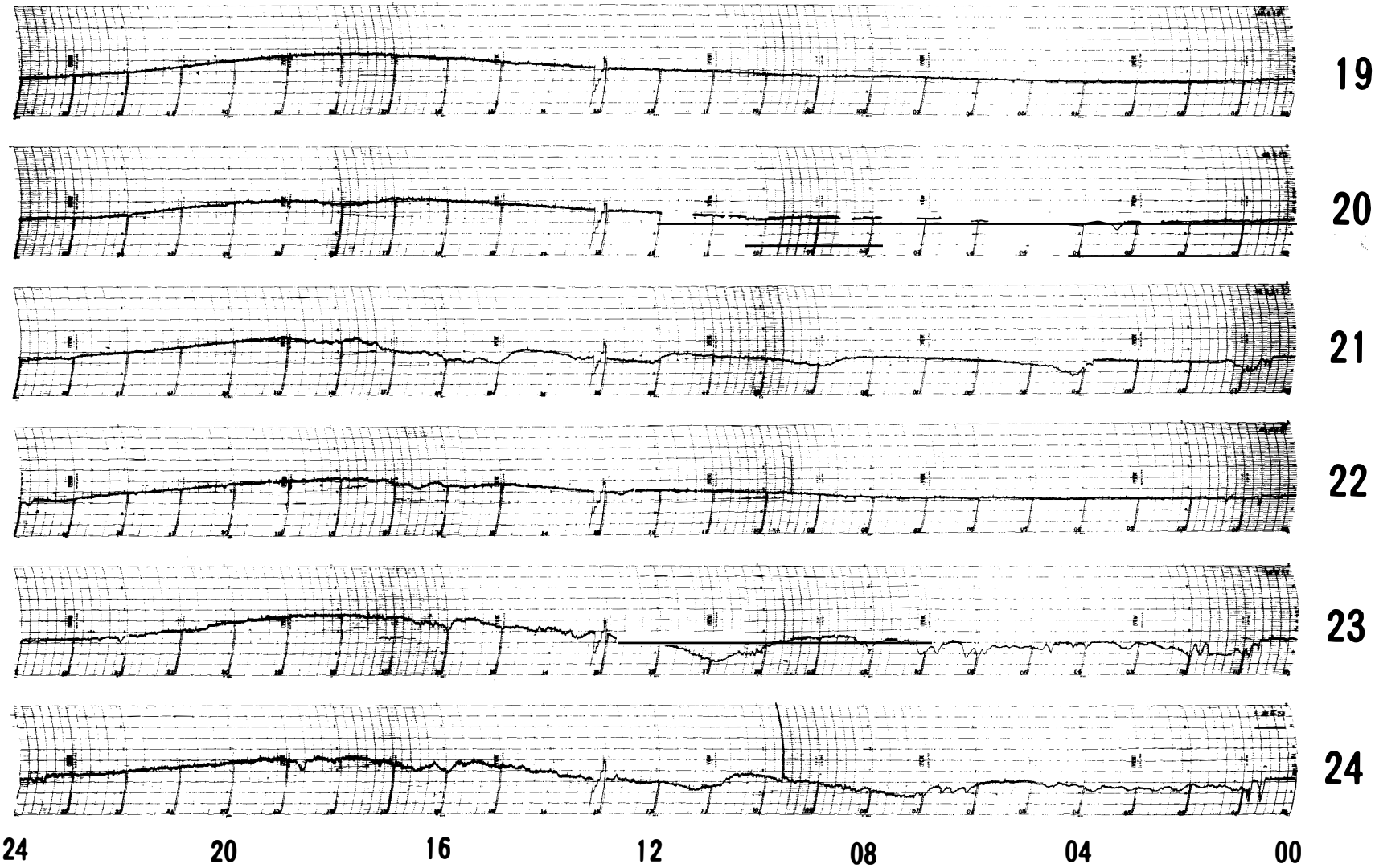
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

SEP 1973



45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

SEP 1973

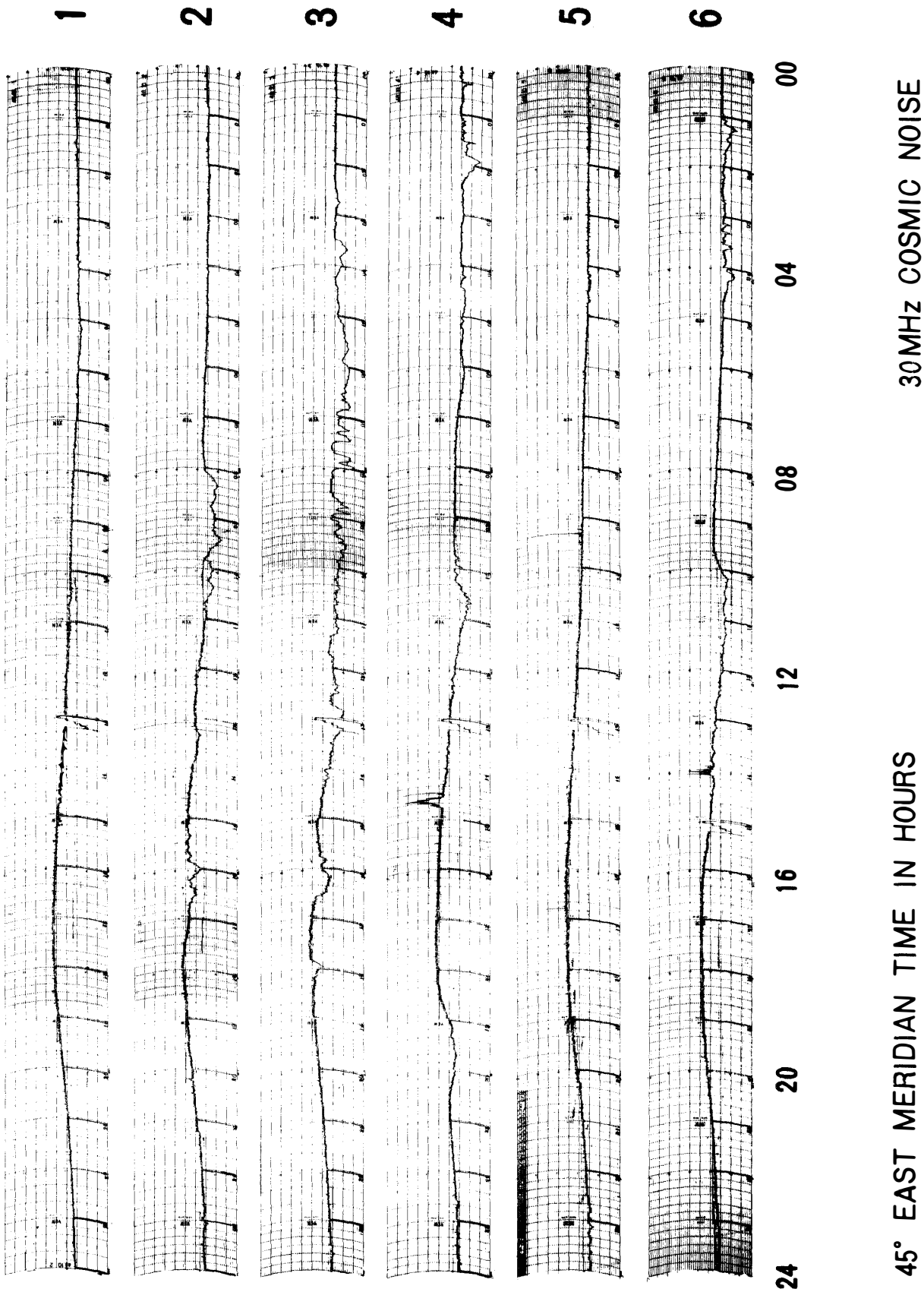
45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

4th.	0900-1645	failure of equipment.
25th.	1300-1600	〃

OCT 1973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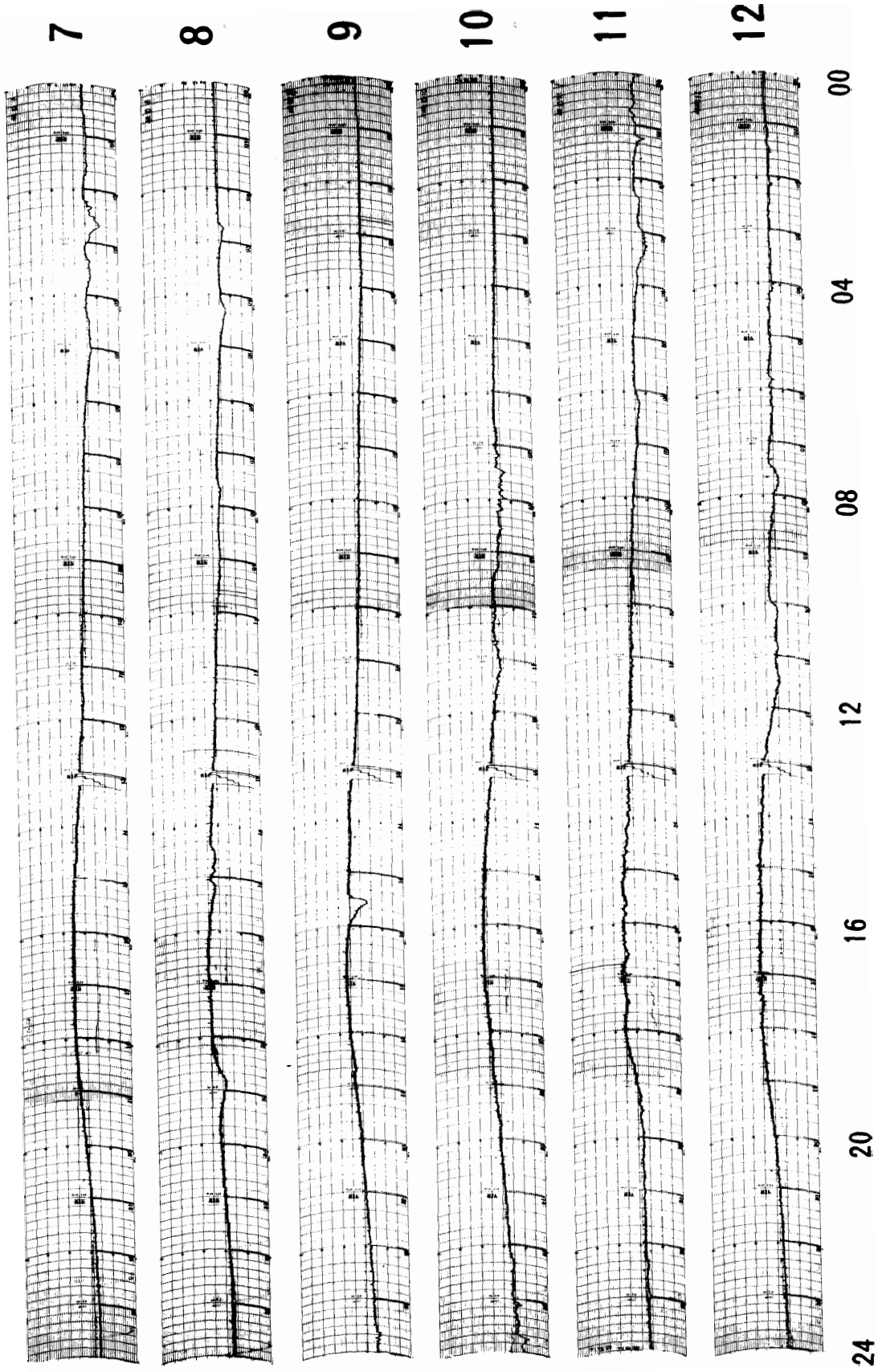
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

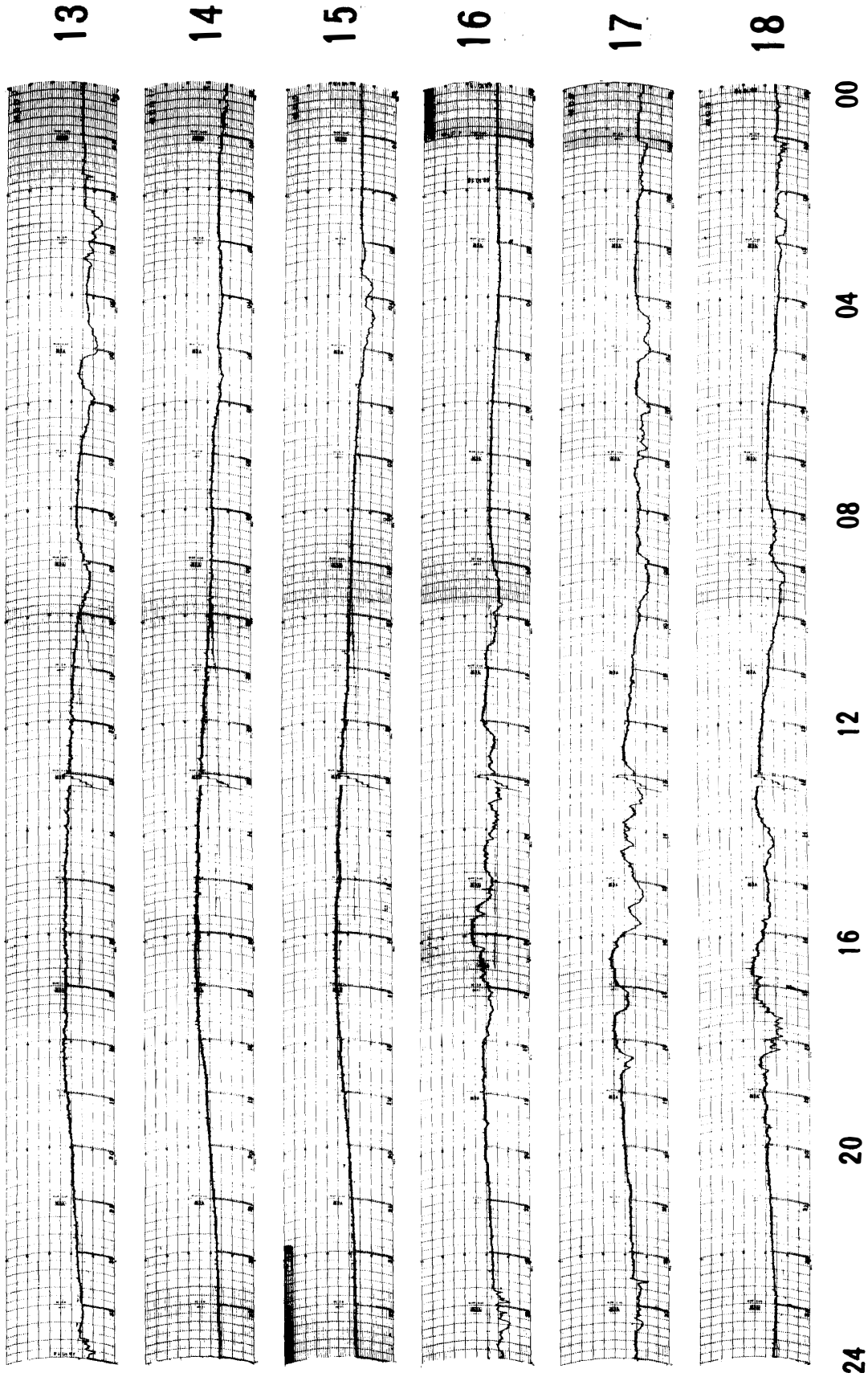
OCT 1973



30 MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

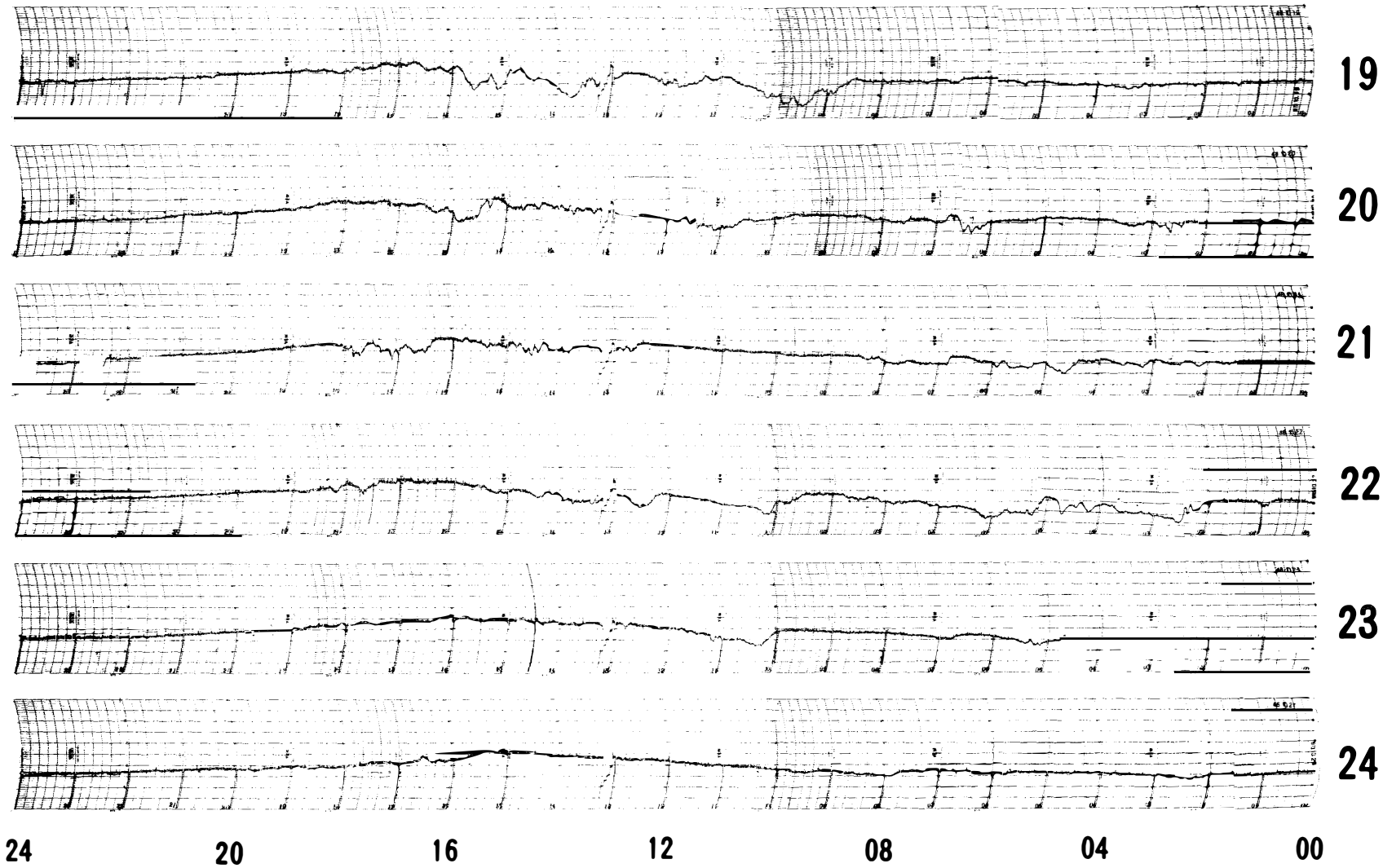
OCT 1973



30MHz COSMIC NOISE

45° EAST MERIDIAN TIME IN HOURS

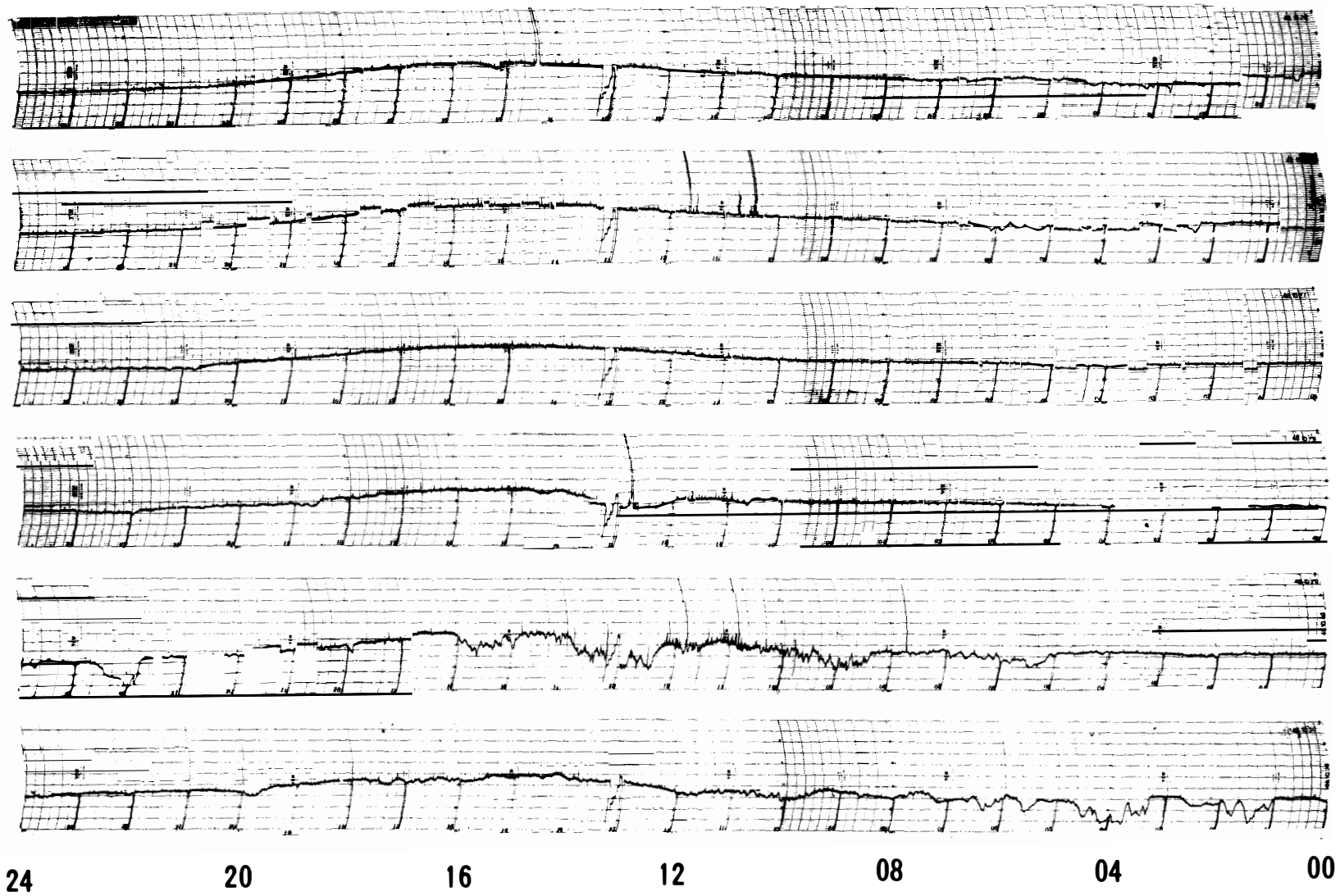
OCT 1973



45° EAST MERIDIAN TIME IN HOURS

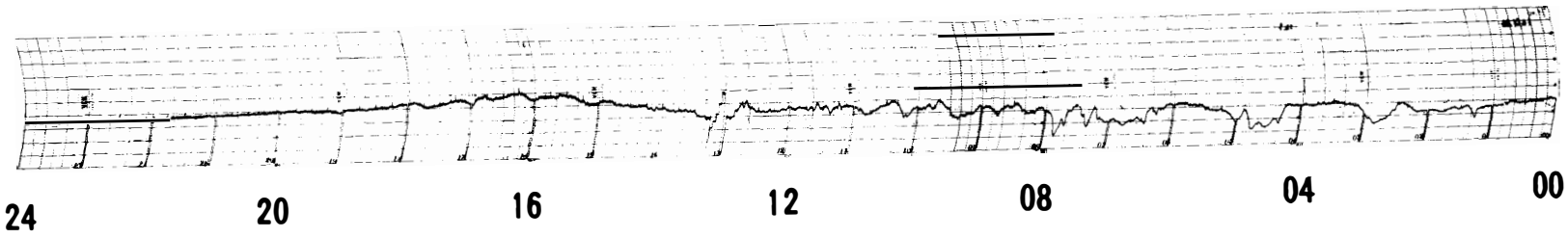
30 MHz COSMIC NOISE

OCT 1973



45° EAST MERIDIAN TIME IN HOURS

30MHz COSMIC NOISE



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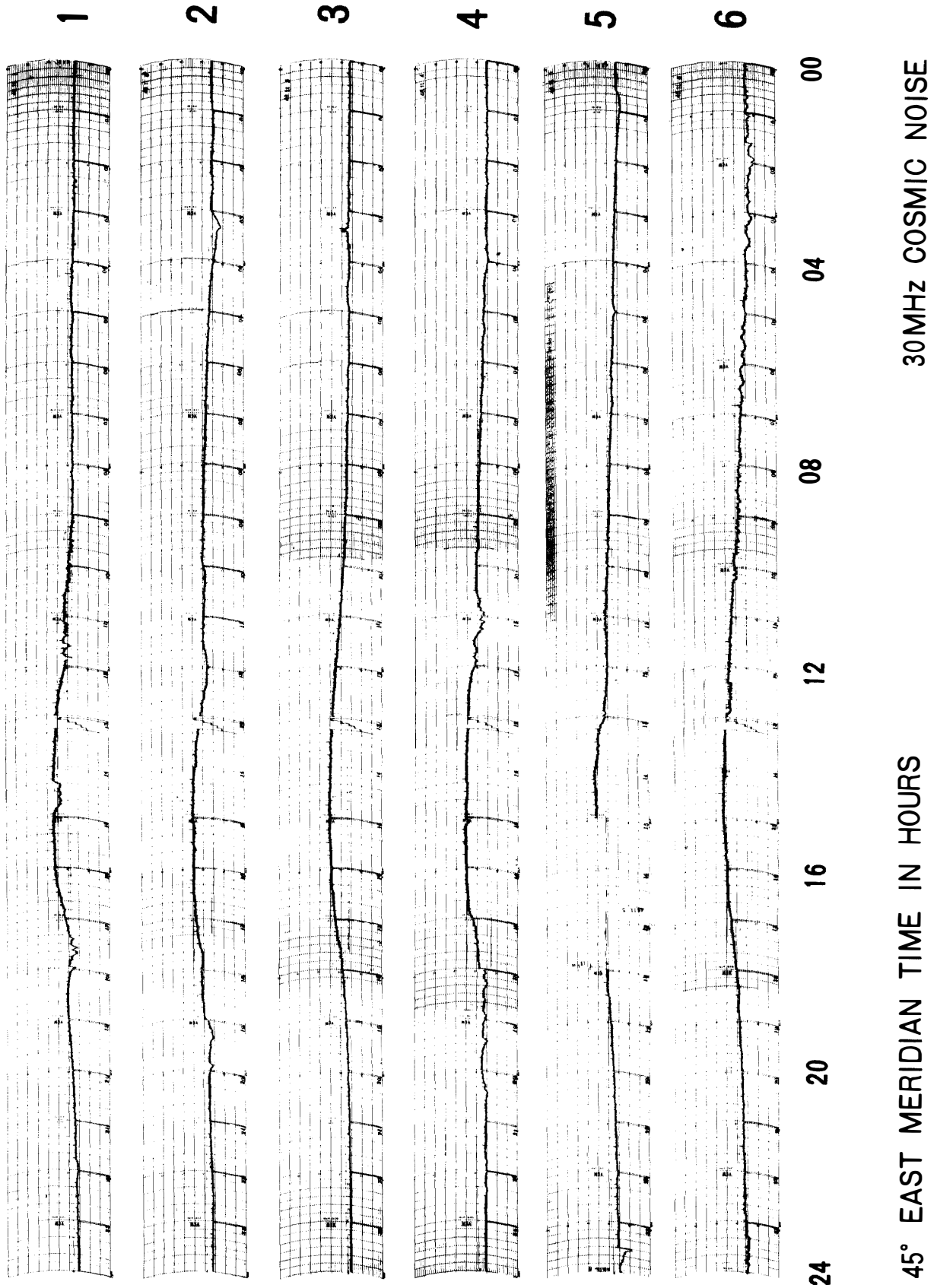
OCT 1973

45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

NOV 1973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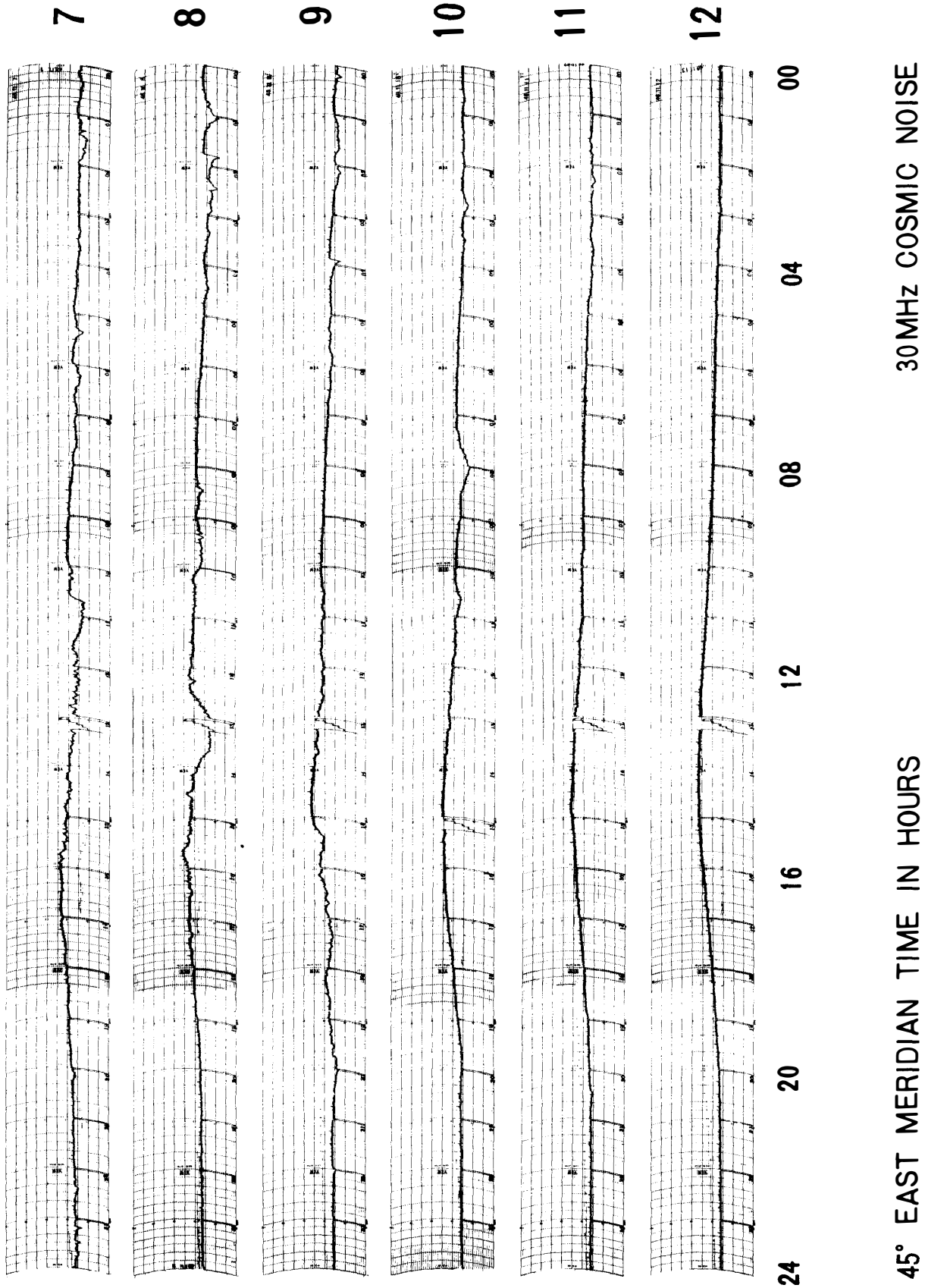
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

NOV 1973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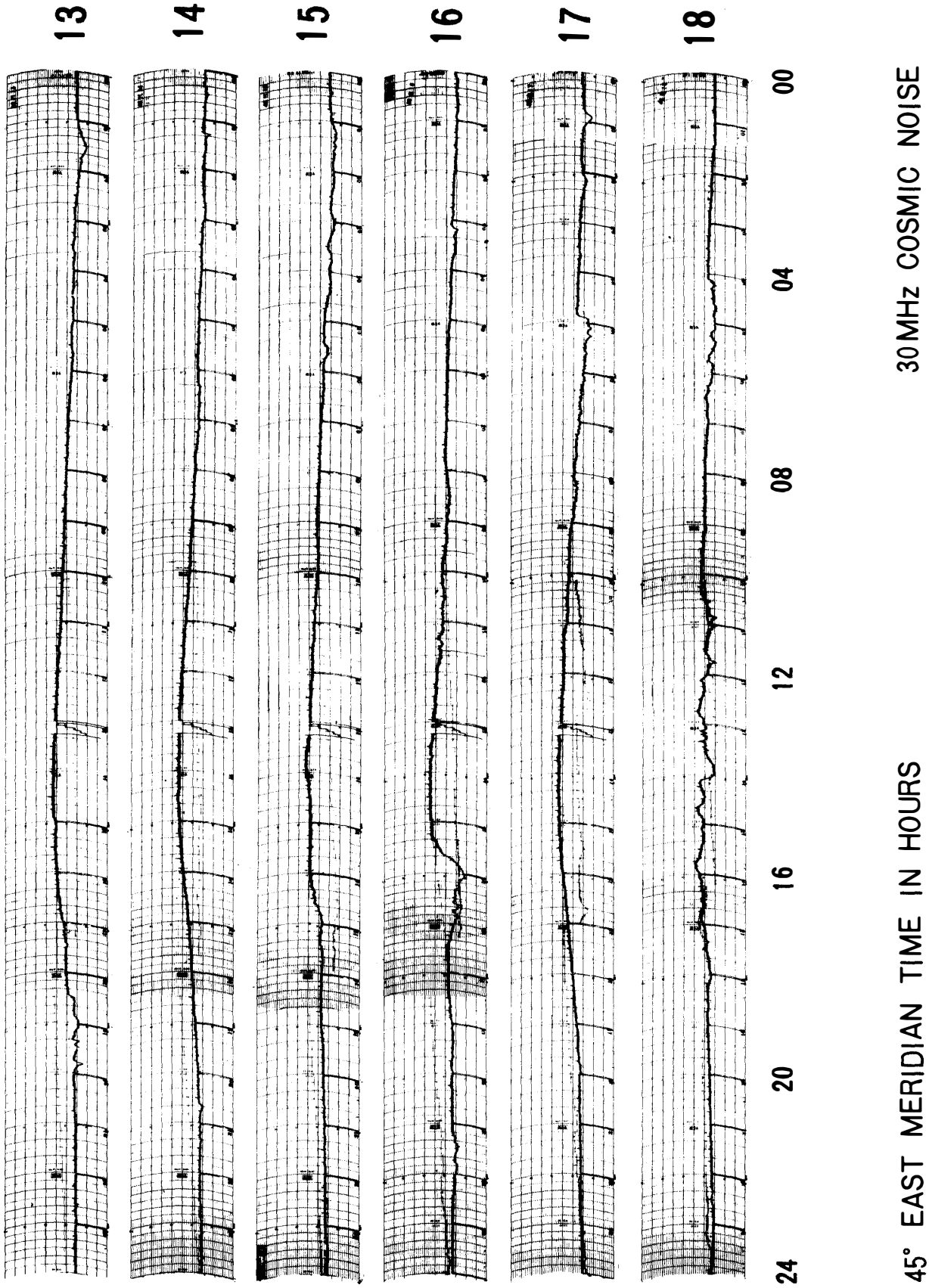
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

NOV 1973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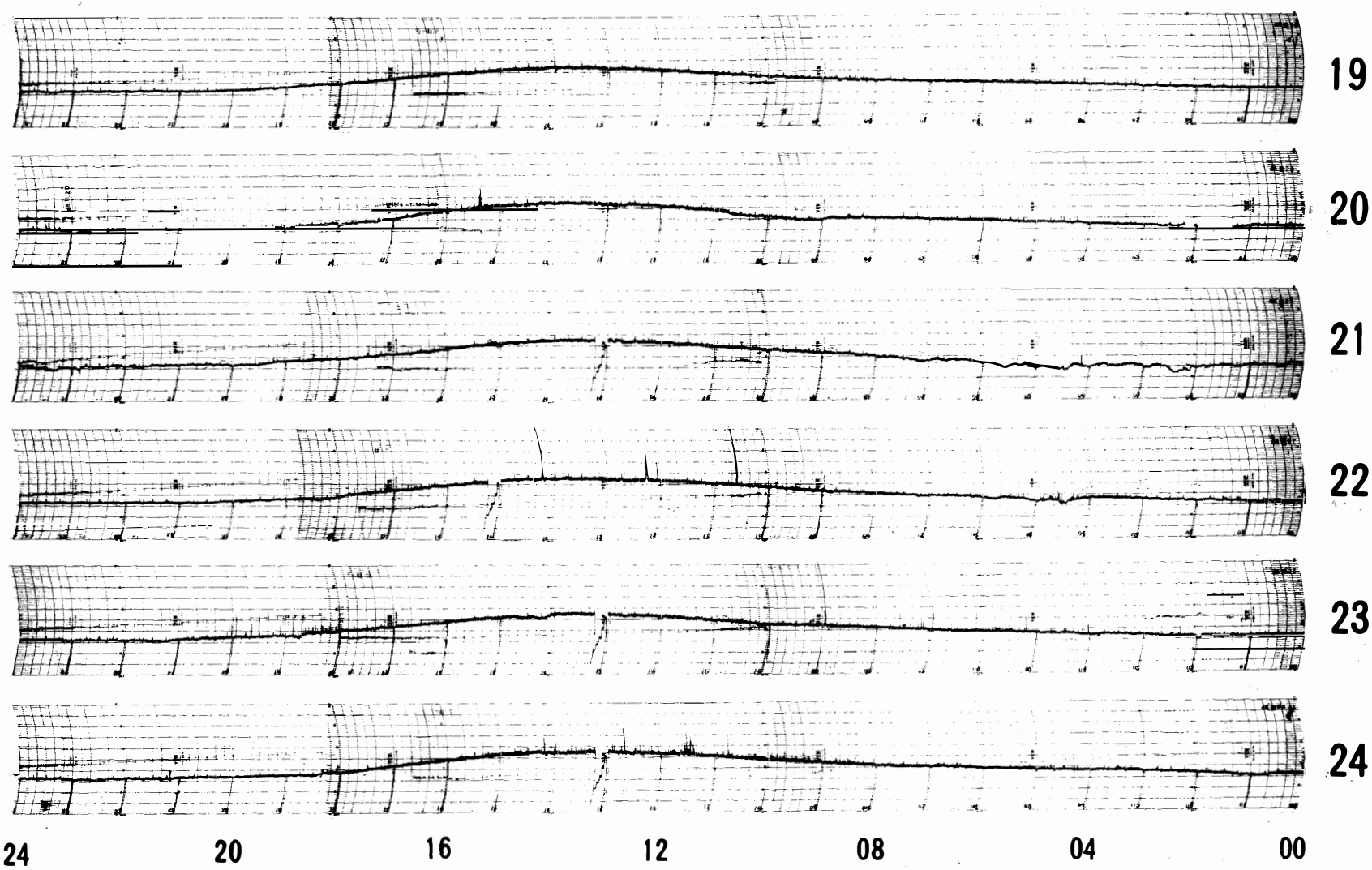
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS

NOV 1973



45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

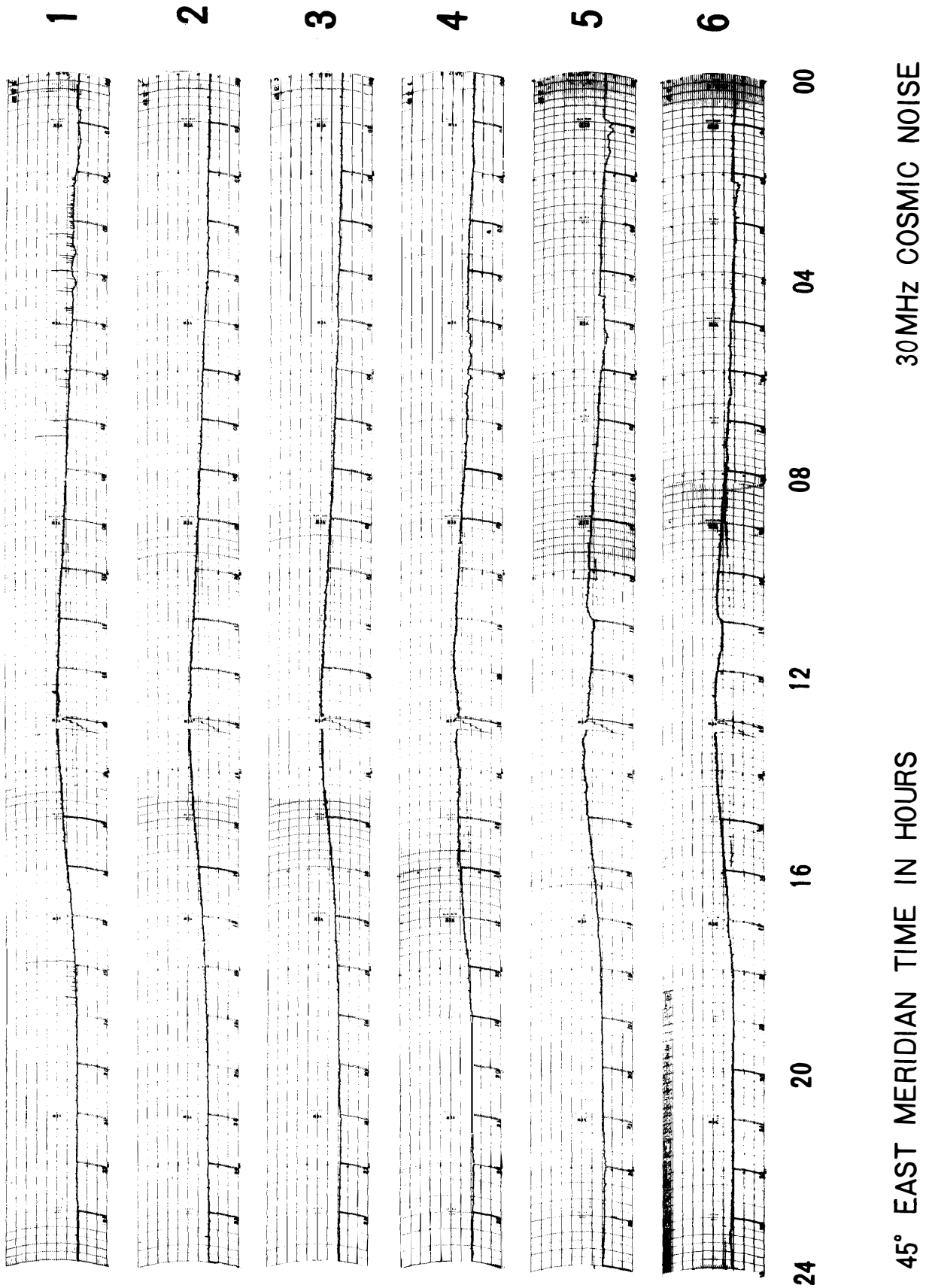
45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

Cosmic noise level obscured or equipment malfunction.

5th.	1500-1800	failure of equipment.
29th.	1535-1825	〃

DEC 1973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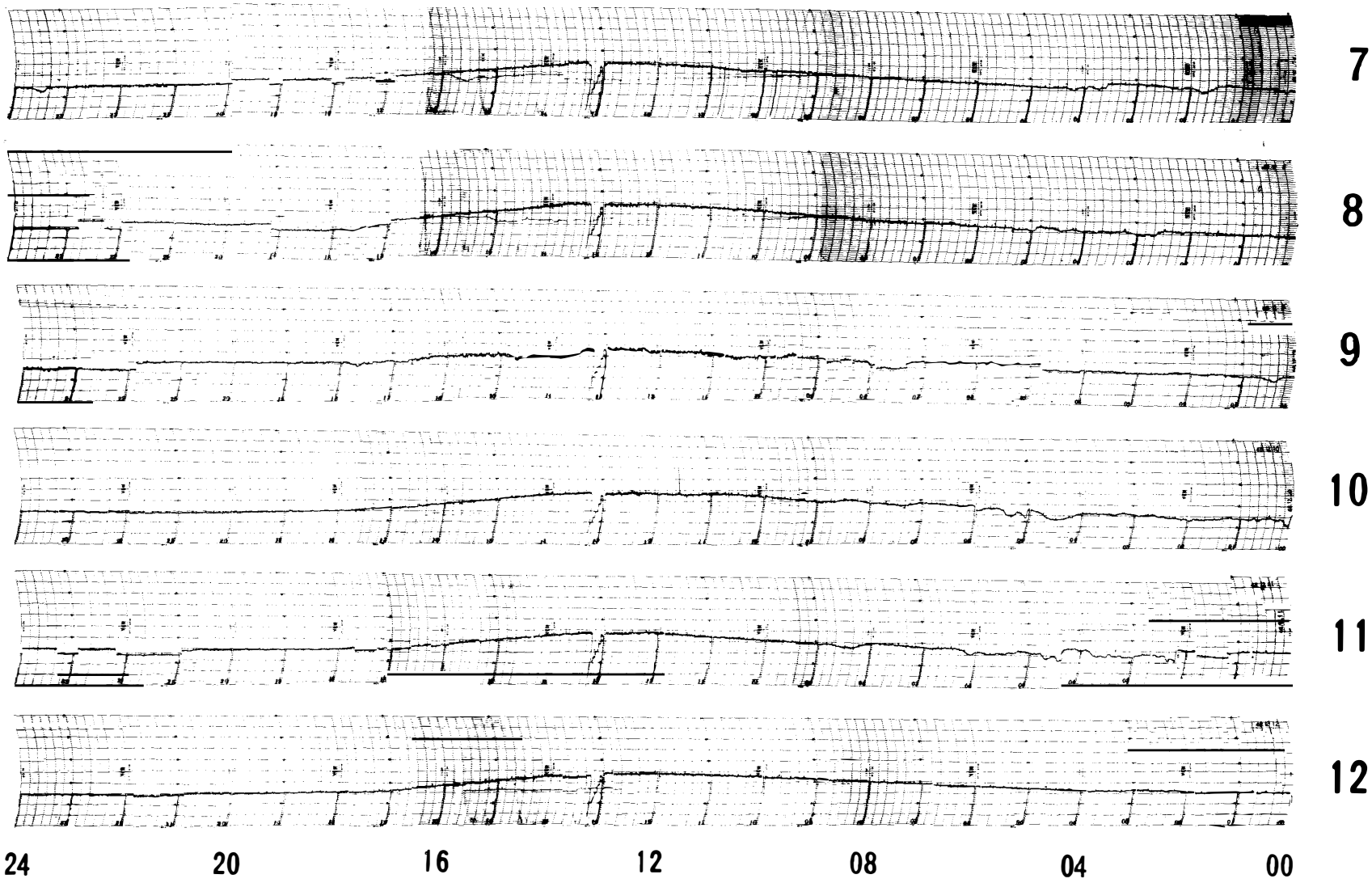
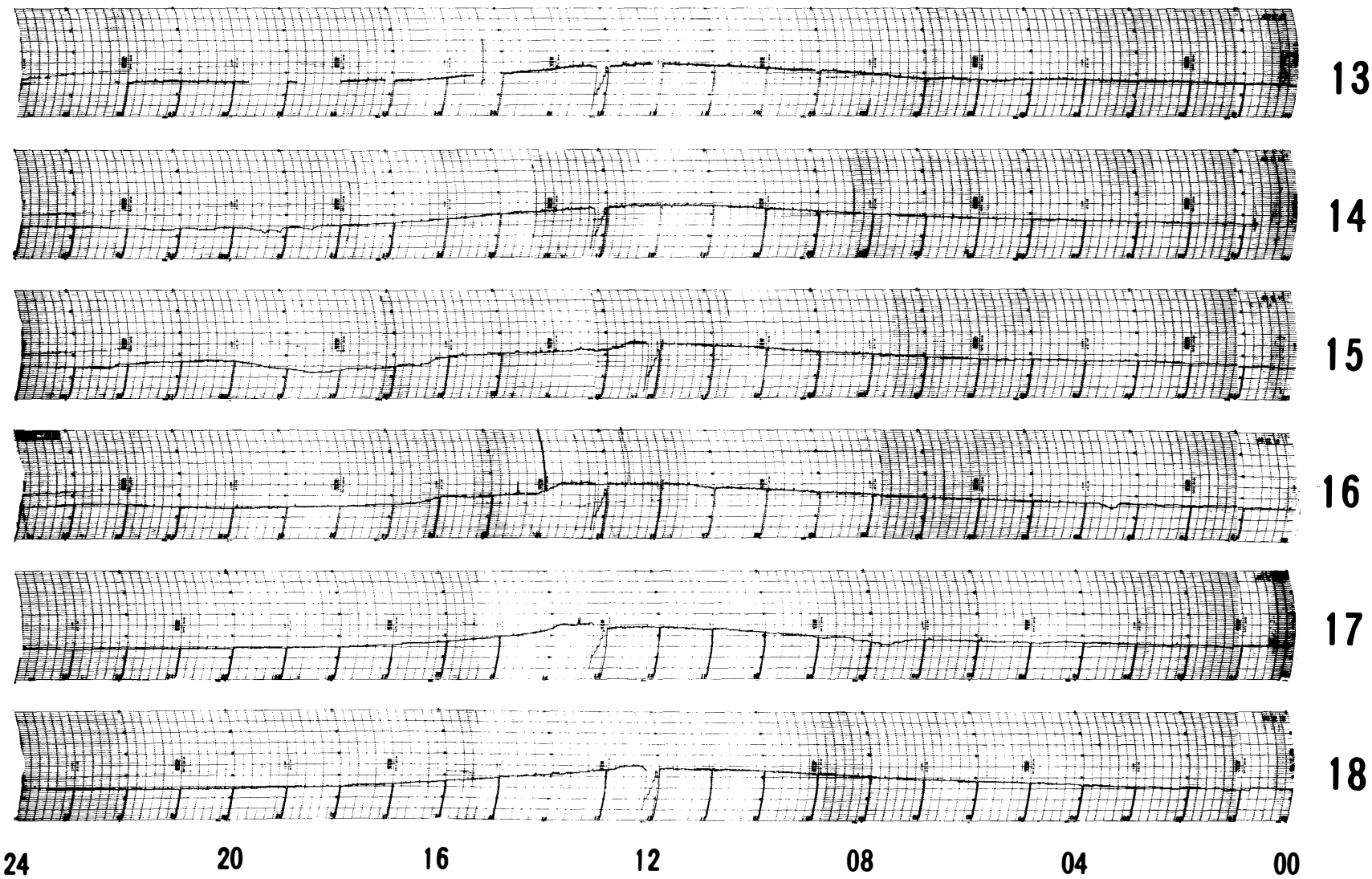
30MHz COSMIC NOISE
45° EAST MERIDIAN TIME IN HOURS



45° EAST MERIDIAN TIME IN HOURS

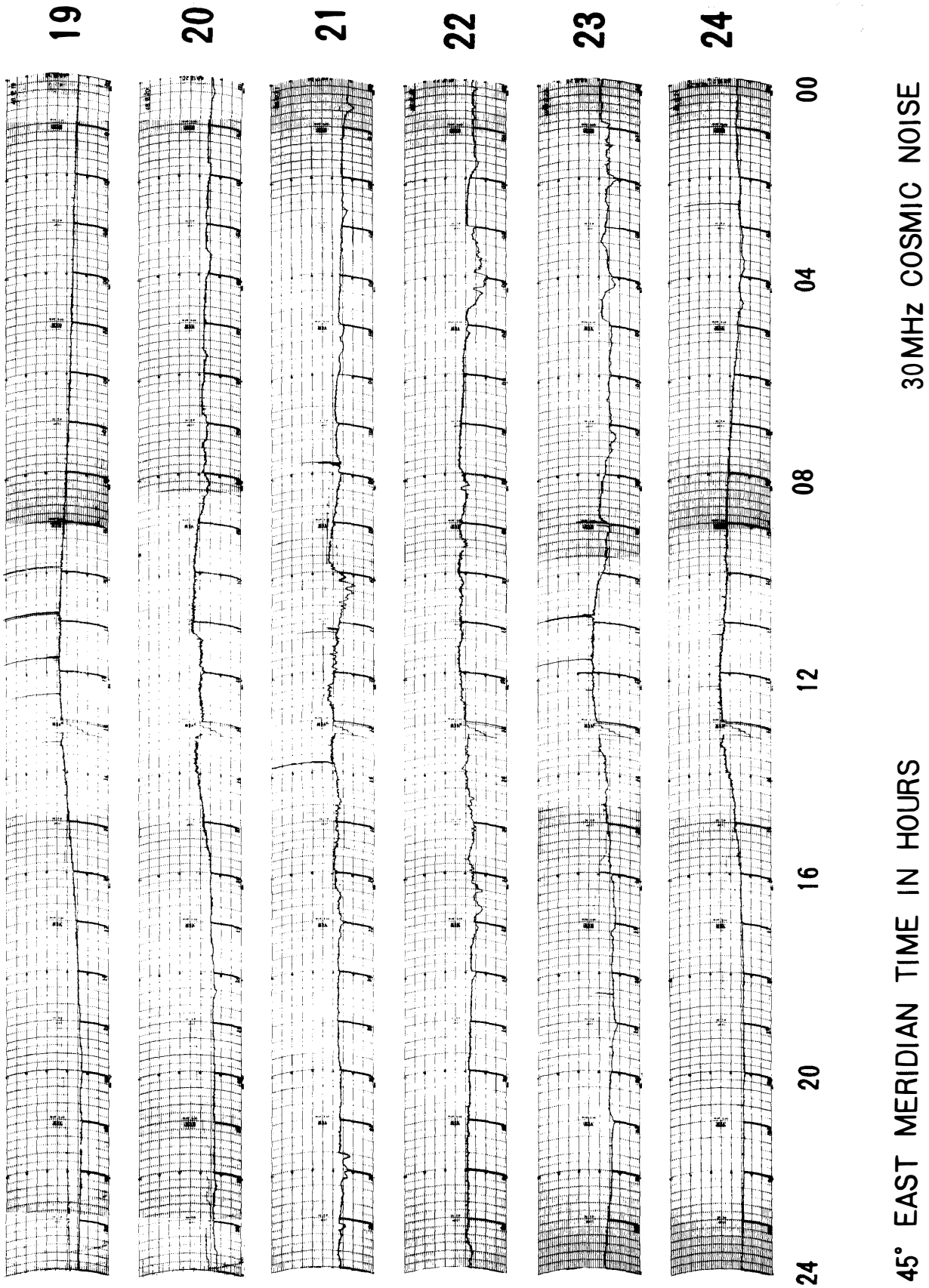
30 MHz COSMIC NOISE



45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

DEC 1973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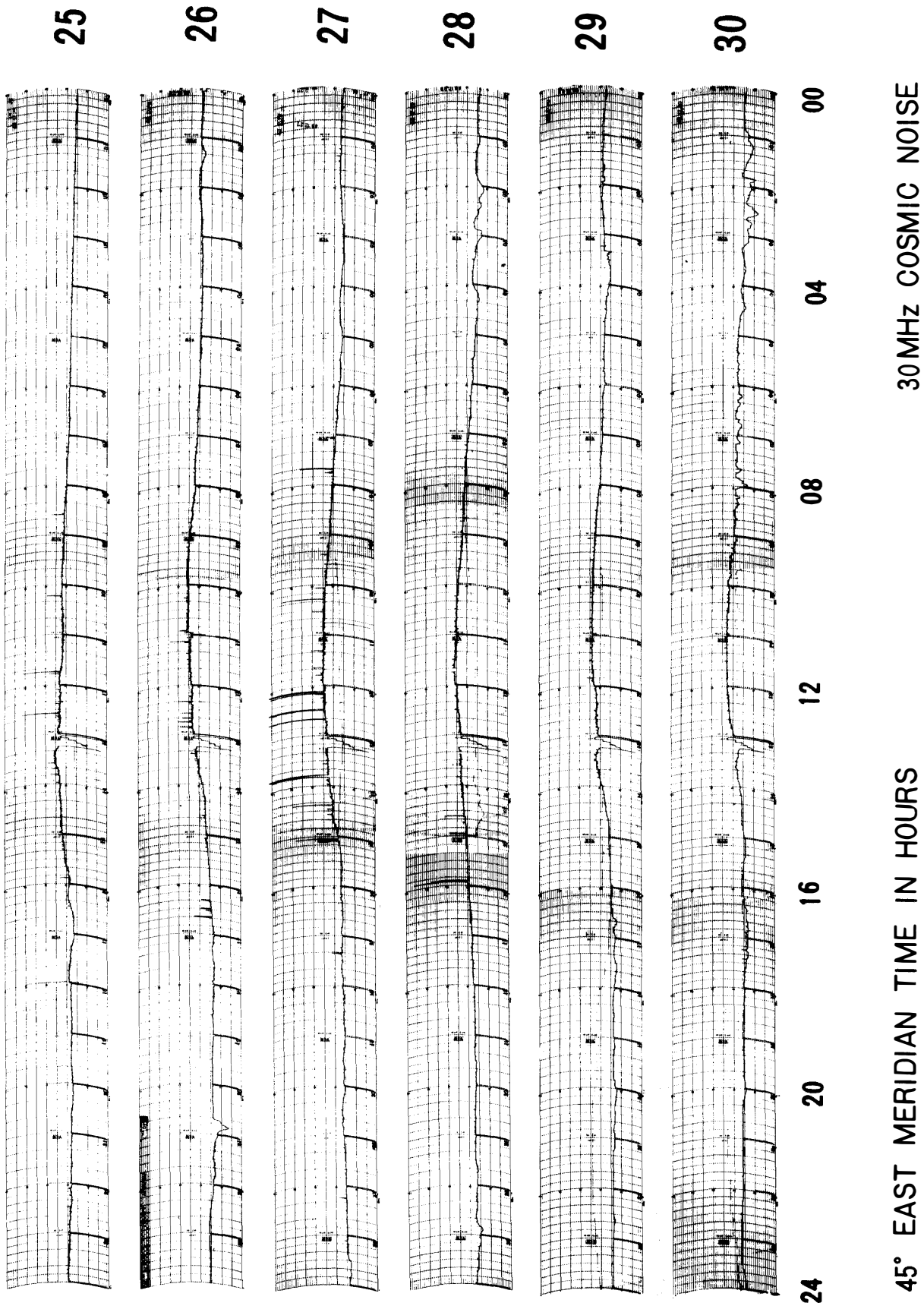
45° EAST MERIDIAN TIME IN HOURS

DEC 1973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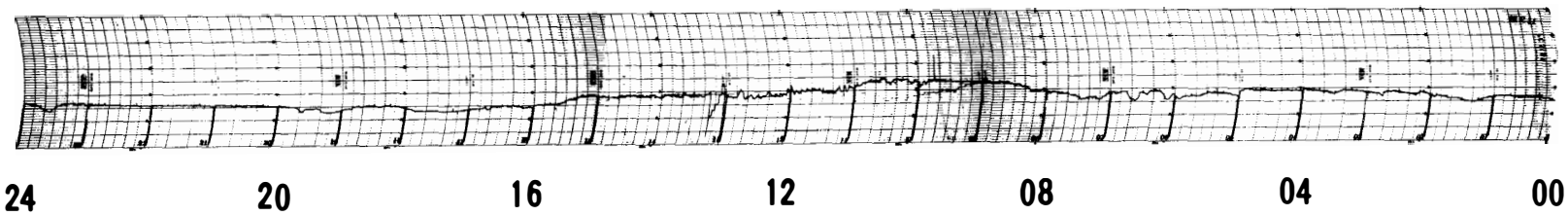

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DEC 1973

45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE