Auroral ASCAPLOT at Syowa Station in 1959 and 1960

Junji NAKAMURA*, Taiichi KITAMURA**
and Shin FUKUSHIMA***

昭和基地の 1959 年及び 1960 年 ASCAPLOT

中村純二*・北村泰一**・福島　紳***

要　　旨

1959 年及び 1960 年昭和基地で極光の全天カメラ観測が行なわれた．ここに掲げるのは，CSAGI の指示要項に基づいて全天カメラフィルムから作成された 2 年分の ASCAPLOT である．

Abstract

Auroral ASCAPLOTs at Syowa Station in 1959 (from Feb. 11 to Oct. 26) and in 1960 (from Feb. 12 to Oct. 6) were presented.

1. Introcuction: An all sky camera was set up on the roof of the observation hut at Syowa Station of JARE[1]. The image of all sky by a convex mirror ($r=230$ m/m, $\phi=300$ m/m) was photographed every minute on 16 m/m Sakura SSS cinefilm. Exposure time was 15 seconds and the film was developed by pandol for 20 minutes at 20°C which gave about ASA 600. The movie camera and time marking dial were driven by a synchronous motor which was regulated by a quartz oscillator having precision of 10^{-4}.

The observations were carried out by J. NAKAMURA and T. KITAMURA through the year of 1959 and by S. FUKUSHIMA through 1960, by the same instruments and observation method.

These all sky films were read separately by three regions of north, zenith and south, as instructed by CSAGI[2]. Diagram of these three regions in a film is shown in Fig. 1a. If aurora appears at the height of 100 km, the above graduation would

* 東京大学教養学部物理学教室，東京天文台．第 1 次及び第 2 次南極地域観測隊員，第 3 次南極地域観測隊越冬隊員．Institute of Physics, College of General Education, the University of Tokyo. Tokyo Astronomical Observatory, the University of Tokyo. Member of the Japanese Antarctic Research Expeditions, 1956-57 and 1957-58. Member of the Wintering Party, the Japanese Antarctic Research Expedition, 1958-60.

** 京都大学理学部地球物理学教室．第 1 次及び第 3 次南極地域観測隊越冬隊員．Institute of Geophysics, Faculty of Science, the University of Kyoto. Member of the Wintering Party, the Japanese Antarctic Research Expeditions, 1956-58 and 1958-60.

*** 元理化学研究所宇宙線実験室研究員．第 3 次南極地域観測隊員，第 4 次南極地域観測隊越冬隊員．1960 年 10 月 9 日昭和基地付近において遭難．The Late Staff of Cosmic Ray Raboratory, Institute of Physical and Chemical Research. Member of the Japanese Antarctic Research Expedition, 1958-59. Member of the Wintering Party, the Japanese Antarctic Research Expedition, 1959-61 and met with an accident near Syowa Station on 9th October 1960.

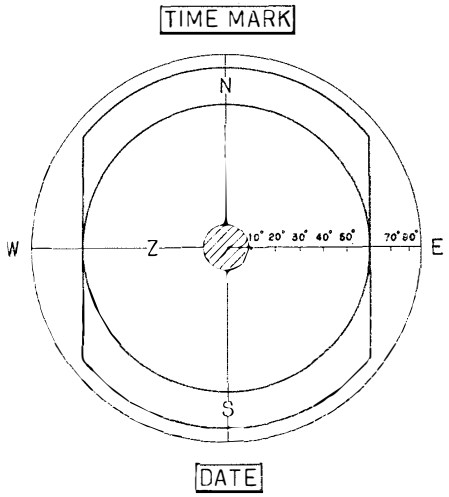


Fig. 1. a) Three regions of N, Z and S in an all sky camera film. The geomagnetic direction N–S was used which was inclined 33°30′W from geographic meridian.

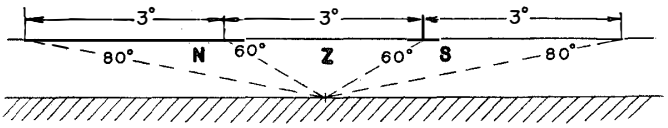


Fig. 1. b) Corresponding regions of N, Z and S at 100 km high.

have a width of three degrees along the geomagnetic meridian as shown in Fig. 1b.

We used 15 minutes graduation; that is, from 53 m to 07 m, from 08 m to 22 m, from 23 m to 37 m and from 38 m to 52 m, every hour in U.T.

Fig. 2 shows the key to auroral index for finding the activity number of ascaplot in any auroral form and auroral intensity. The auroral forms as represented in Fig. 2, except ⊿, are in accordance with the "Photographic Atlas of Auroral Forms", Oslo, 1927; and ⊿ indicates the doubtful auroral forms because of cloudiness.

KEY TO AURORAL INDEX

FORMS	ACTIVITY / INTENS. \ KEY	I			II			III		
		1	2	3	4	5	6	7	8	9
△	0⁺	○	●							
G	1, 1⁺		○	●						
DS	2, 2⁺ 3, 3⁺			○	●					
S	4				○	●				
HA	0⁻, 1		○	●						
	1⁻, 2 0⁺P, 1P			○	●					
	2⁻, 3 1⁺P				○	●				
	3⁻, 4 2 P, 2⁺P					○	●			
HB	3 P, 3⁺P						○	●		
	4P							○	●	
R	0⁻, 1		○	●						
	1⁻ 0⁺P, 1P			○	●					
	2, 2⁺ 1⁺P, 2 P				○	●				
	3, 3⁺ 2⁺P, 3P					○	●			
	4 3⁺P, 4 P						○	●		
RA	0⁻, 1 0⁺P, 1 P			○	●					
	1⁻, 2, 2⁺ 1⁺P, 2P, 2⁺P				○	●				
	3, 3⁻, 4 3P, 3⁺P, 4 P					○	●			
RB	0⁻			○	●					
	1 0⁺P, 1P				○	●				
C	1⁻, 2 1⁺P, 2 P					○	●			
	2⁻, 3 2⁺P, 3P						○	●		
D	3⁻, 4 3⁺P							○	●	
	4P								○	●

Fig. 2. The key to auraral index. For ascaplots, scale values of auroral activity were used.
Symbol "P" attatched to auroral intensity represents pulsative aurora.

Auroral intensities were determined by the following four grades:

1 (weak) Brightness of Milky Way

2 (medium) Brightness of moonlit cirrus cloud
3 (bright) Brightness of moonlit cumulus cloud
4 (very bright) Much brighter than 3.

Comparing this scale with our photometric results, we found some differences in absolute intensity between our values and Dr. HUNTEN's[3] as shown in Table 1.

Table 1. Mean absolute intensities in kilo-Rayleighs (kR) of [OI] 5577 Å line corresponding to auroral intensities of international unit (A. I. of I. U.).

A. I. of I. U.	0^+	1	1^+	2	2^+	3	3^+	4
Author's	0.5	1	2.5	5	10	25	50	100
HUNTEN'S		1		10		100		1000

The writer adopted the auroral intensity of international unit by his own scale.

In Fig. 2 two kinds of key number are given for a certain auroral form of certain intensity. The open circle is used if the aurora is observed for less than half the interval, the filled circle when the aurora is observed for more than half of the interval.

If more than one auroral forms are present, the key number of the most important form which appeared in the period was determined and one is added to the key number. This rule was restricted to such situation when the accompanying form is active enough to justify this increase. For example: RB of 2 in A.I. of I.U. exists for 15 minutes (=index 6) together with HA of 1^+ in A.I. of I.U., the index number becomes 7.

The value of our key number is somewhat different from the recommended one[2]. For example, bright HB with violent motion is originally defined by index 6. In our scaling, however, HB of 3P is classified as index 7. Because, sometimes the difference between PHB and PRB is considered to arise from the swift motion or developing conditions, and both correspond to high auroral activity. Similar difference may be seen somewhere else in the key index, but the whole results may have not much difference in both systems, having almost the same mean values.

The ascaplot intervals are from 53 m to 22 m, for the first half-hour, and from 23 m to 52 m for the second half-hour. For interval, 53 m–22 m, the highest notation of the two intervals 53 m–07 m and 08 m–22 m is plotted. For interval 23 m–52 m the highest notation of the two intervals of 23 m–37 m and 38 m–52 m is plotted.

2. Ascaplot: In all sky camera plotting, the five-line system works as follows (Fig. 3):

Fig. 3. Line number and several examples of various zenith intensities in five-line system.

First line : aurora present in north range
Second line: aurora present in zenith range
Third line : aurora present in south range
The fourth and fifth lines give the auroral intensity in the zenith range only, according to the activity from 0 to III.
0 =no plotting in the second, fourth and fifth lines
I =plotted in the second line
II =plotted in the second and fifth lines
III=plotted in the second, fourth and fifth lines.
Some examples of plot are shown in Fig. 4. In this case, twilight corresponds to the sun's height of minus 12 degrees.

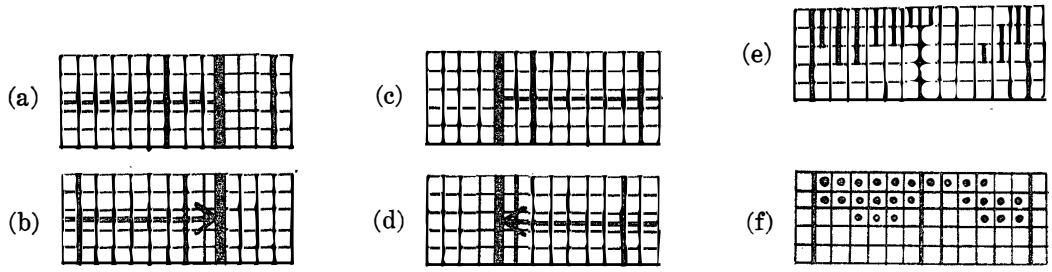


Fig 4. Examples of plotting. a) Start in darkness, b) Start in twilight, c) Stop in darkness, d) Stop in twilight, e) Cloudy, f) Partly cloudy or hazy.

For distinguishing the nights without aurora from the nights without observations, a thick line was drawn as in Fig. 5.

Fig. 5. Method of showing nights without aurora and nights without observation.
a) No observation, b) Clear sky no aurora.

Acknowledgements

The author express his hearty thanks to Prof. M. HURUHATA of Tokyo Astronomical Observatory for his constant encouragement and guidance, and also to members of the wintering party of JARE III for their discussions and to Miss INAGAKI for drawing the ascaplots.

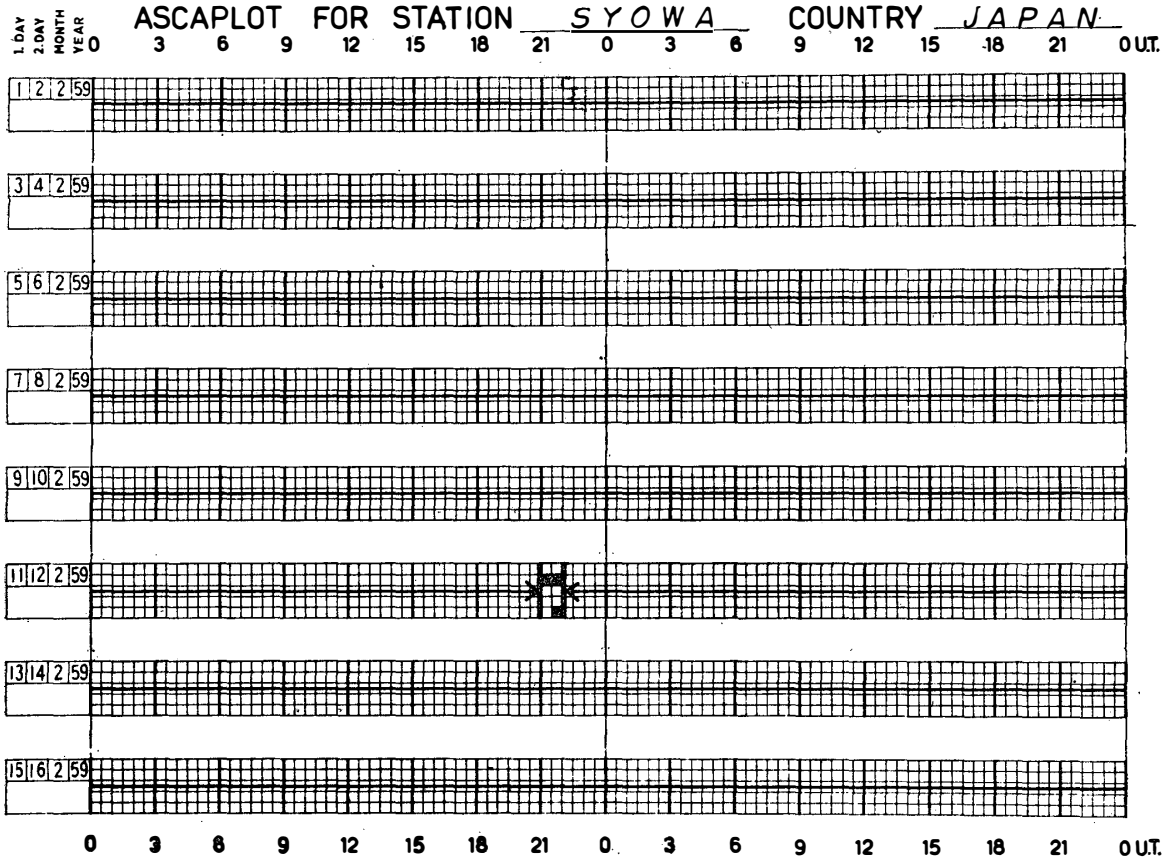
References

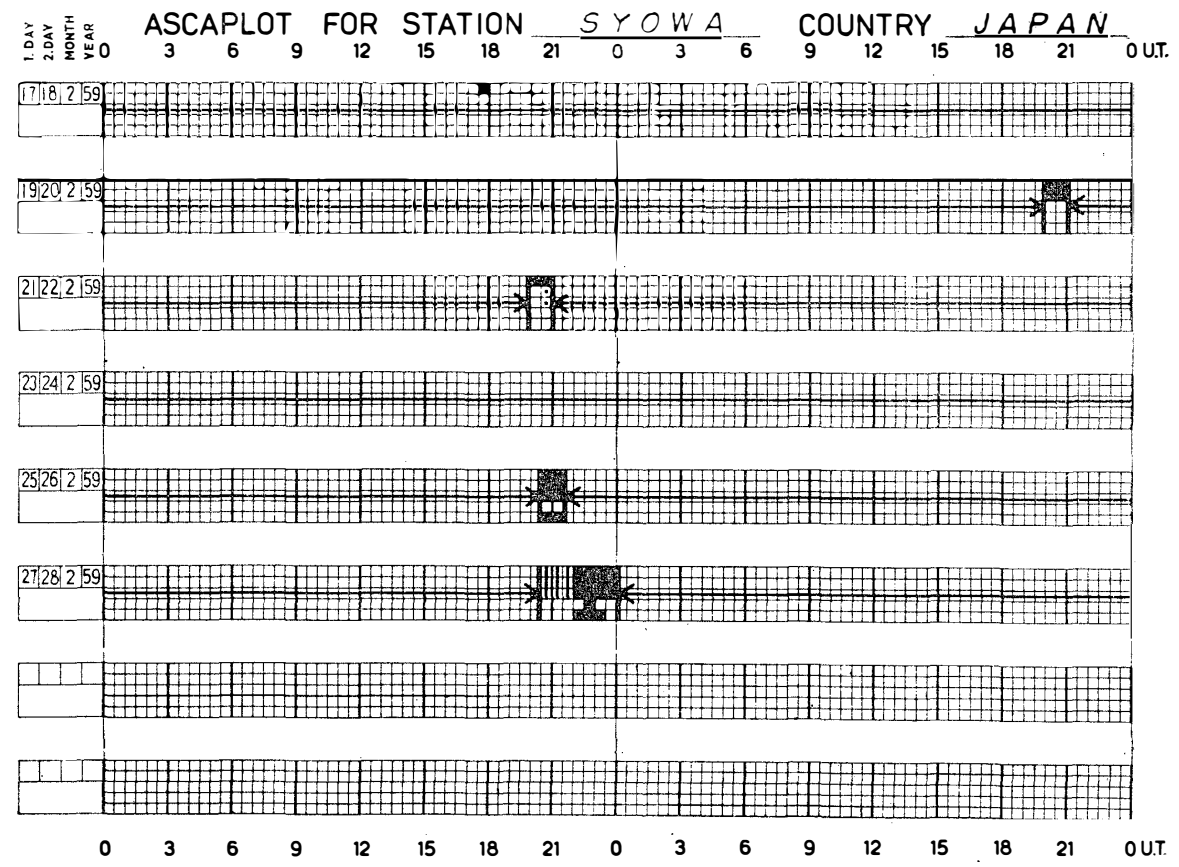
1) J. Nakamura: Antarctic Record, No. **12**, 1 (1961).
2) W. Stoffregen: Instructions for Scaling Auroral Ascaplots and Auroral Indices, Upsala (1959).
3) D. M. Hunten, F. E. Roach and J. W. Chamberlain: Jour. Atm. and Terr. Phys., **8**, 345 (1956).

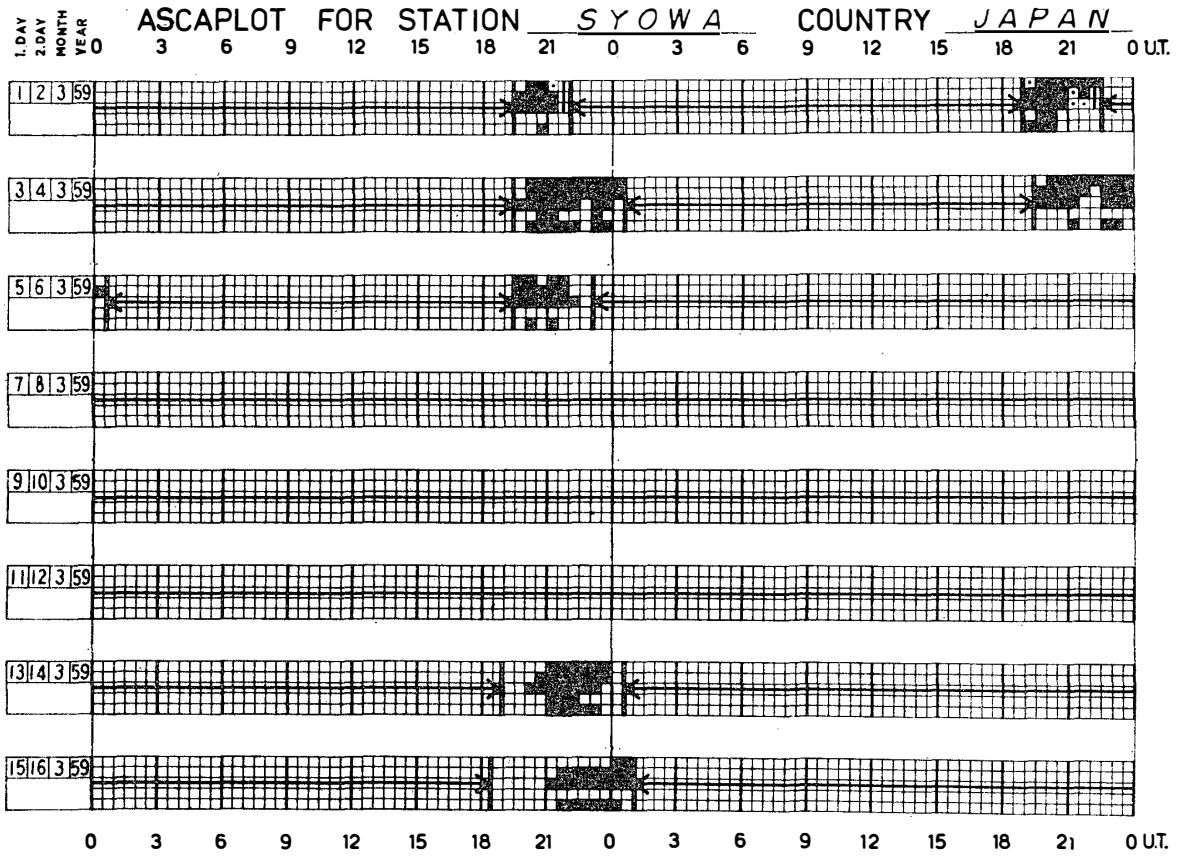
(*Received Feb. 21, 1962*)

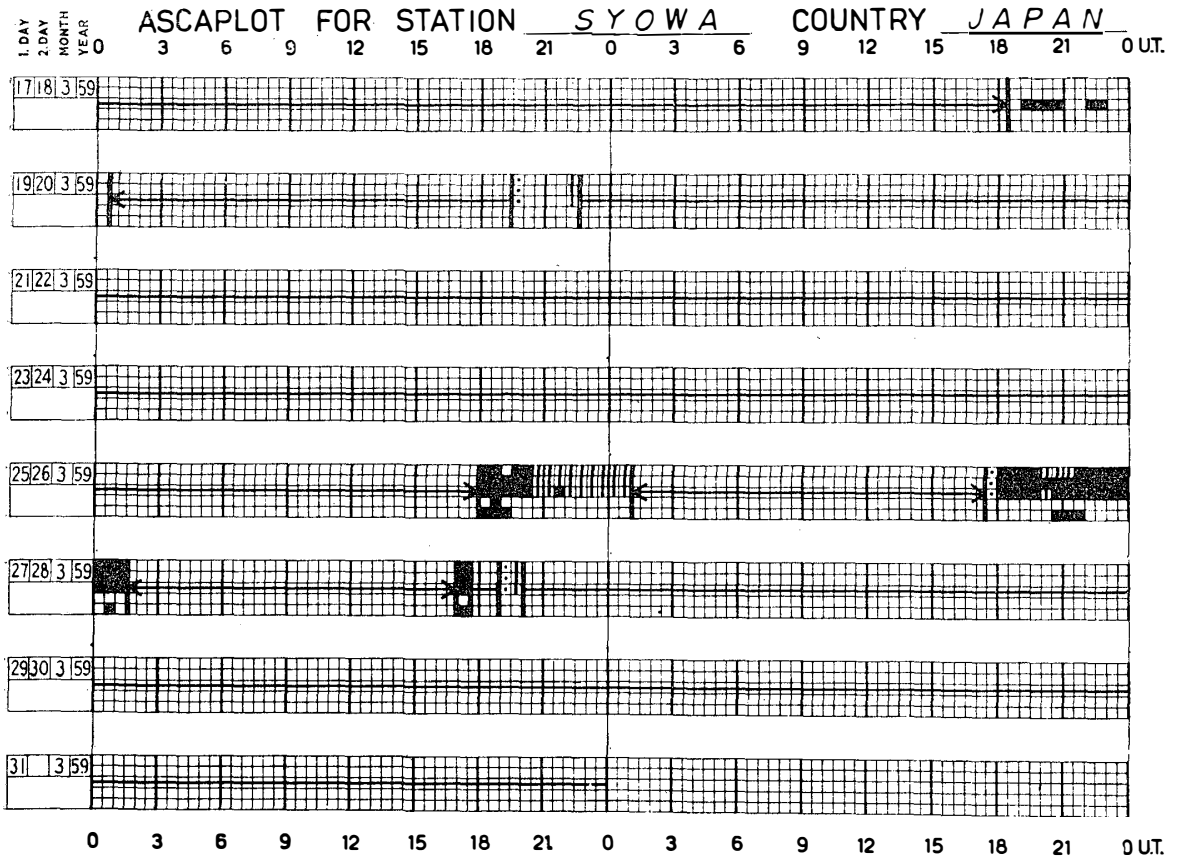
Fig. 6. ASCAPLOT at Syowa Station in 1959 from Feb. to Oct. and in 1960 from Feb. to Oct. The time for all notations is U. T. which is delayed by three hours to L. T.
Location of Syowa Station is as follows:

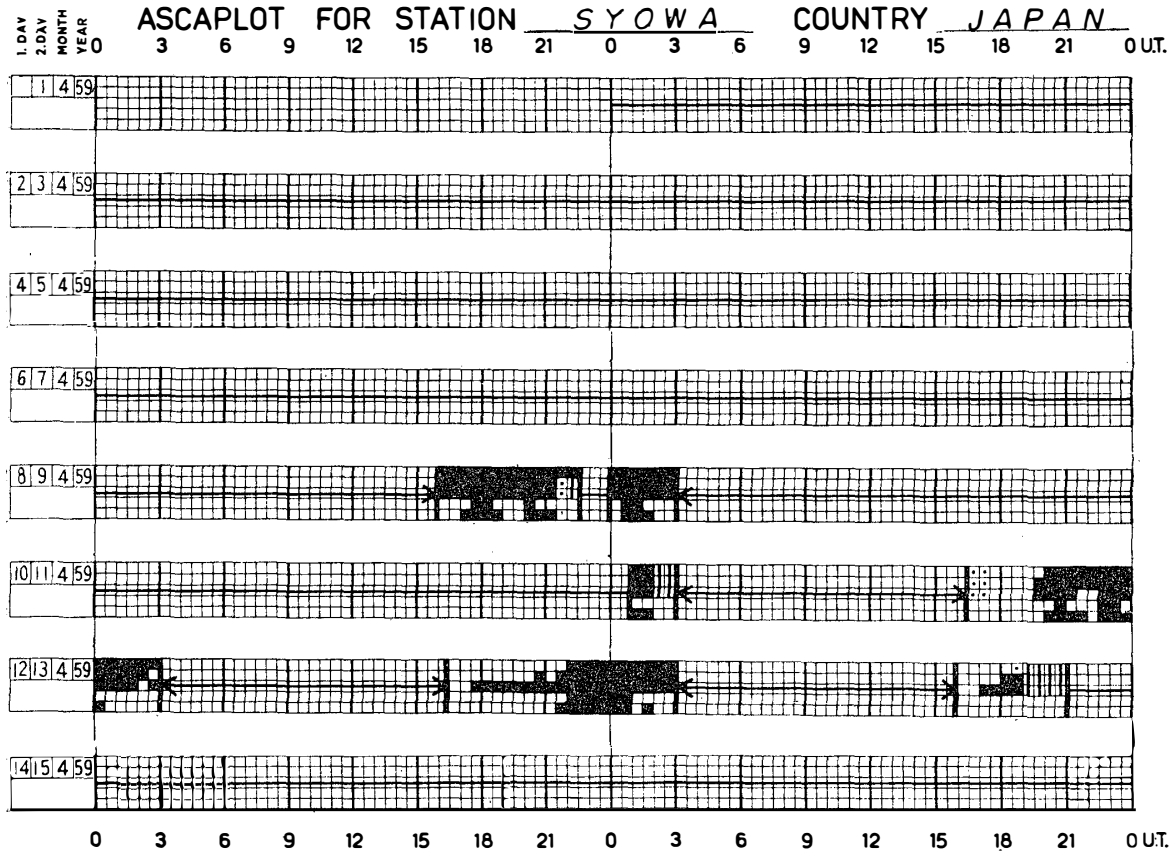
Geographic lat. = 69°02′S	long. = 39°36′E
Gemagnetic lat. = −69.7°	long. = 77.4°
Height from sea level = 14 m	

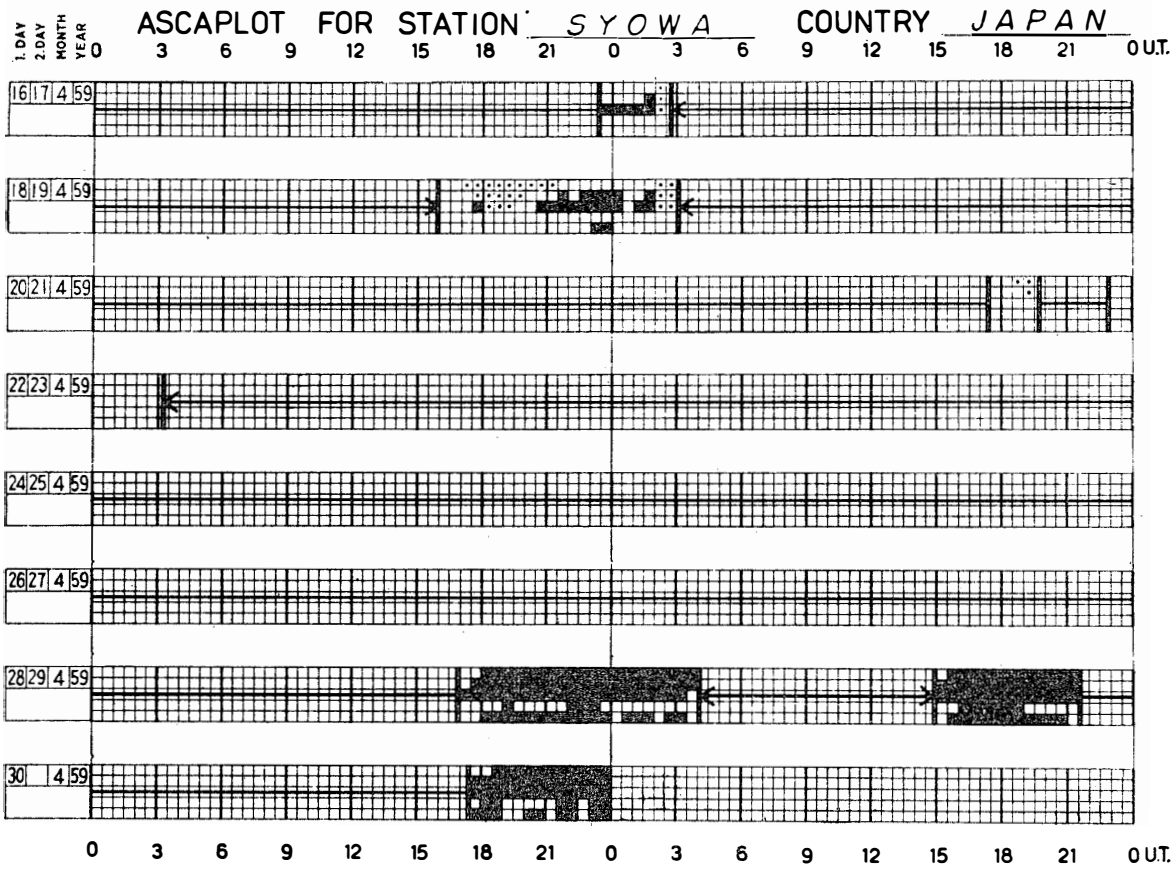


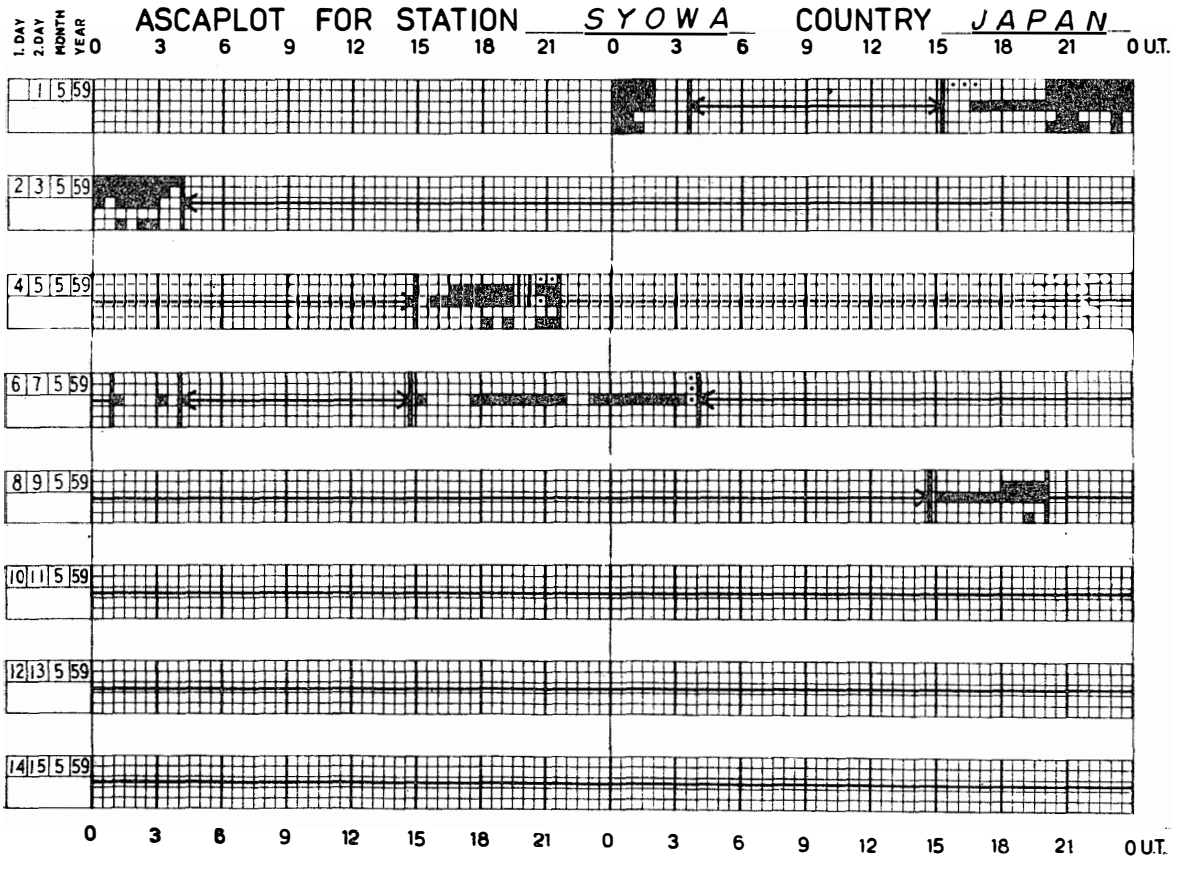

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 2 59
19 20 2 59
21 22 2 59
23 24 2 59
25 26 2 59
27 28 2 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

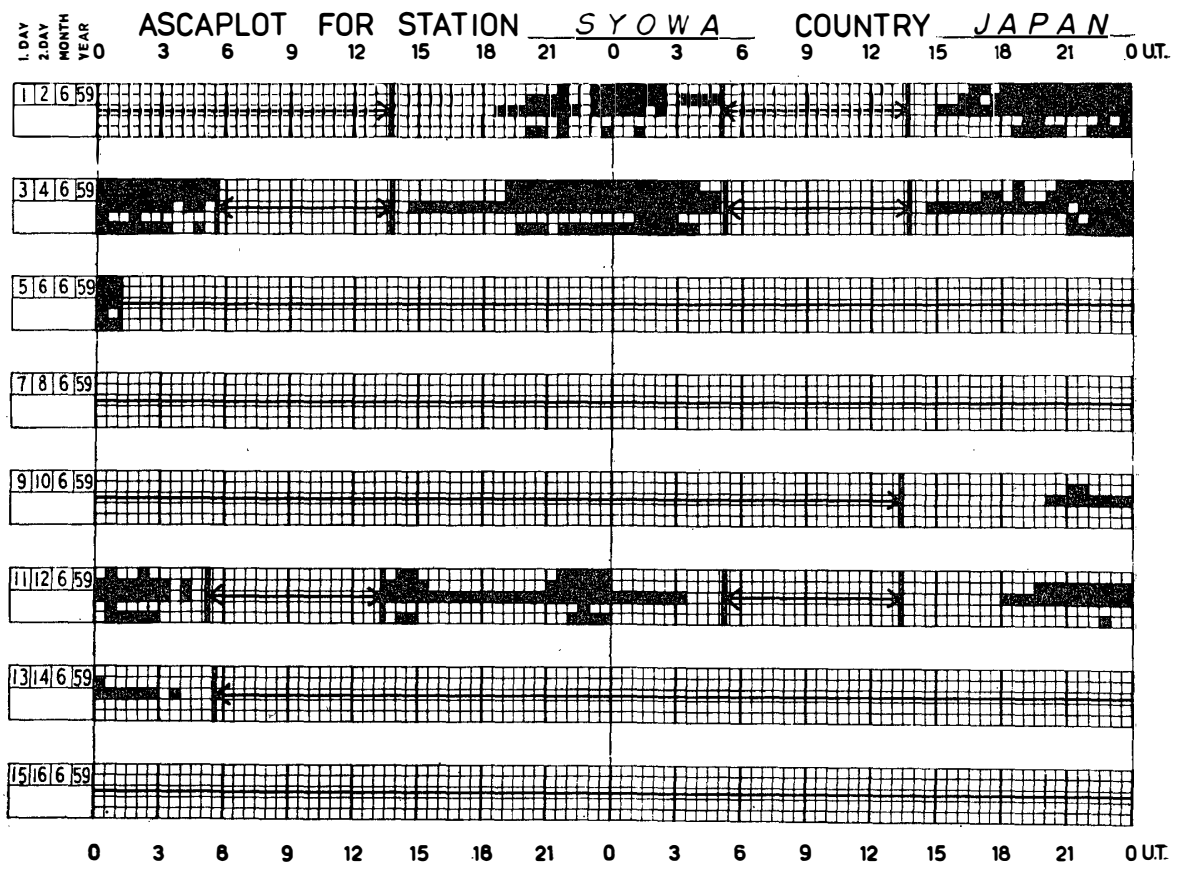

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 3 59
3 4 3 59
5 6 3 59
7 8 3 59
9 10 3 59
11 12 3 59
13 14 3 59
15 16 3 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

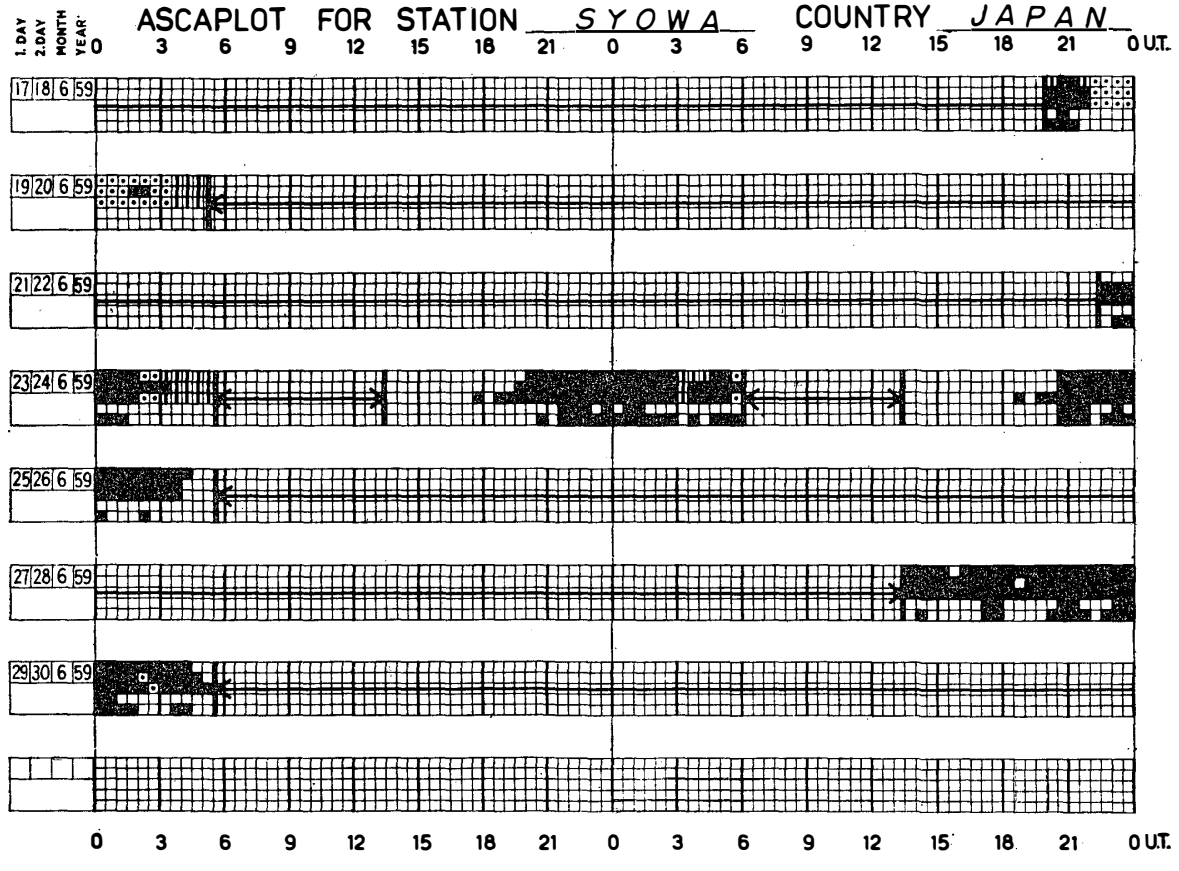

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 3 59
19 20 3 59
21 22 3 59
23 24 3 59
25 26 3 59
27 28 3 59
29 30 3 59
31 3 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

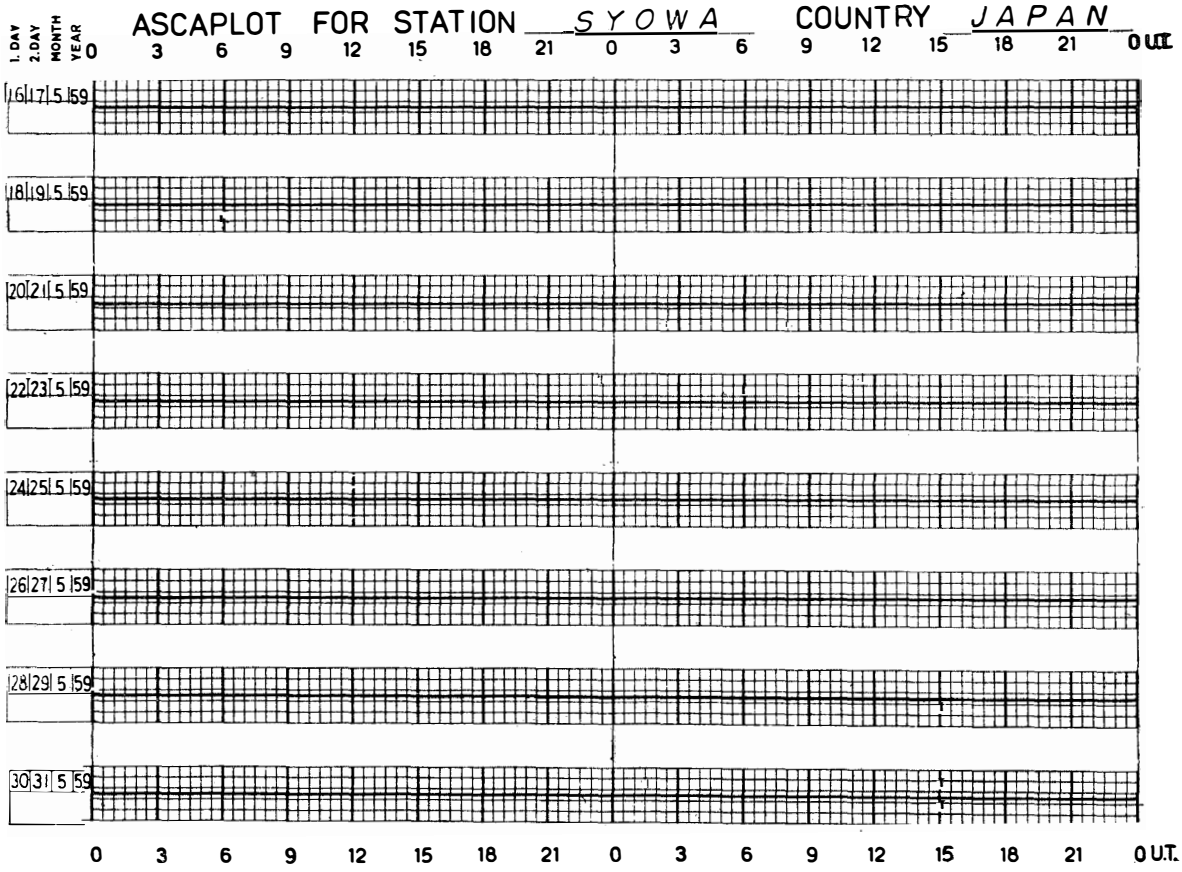

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 4 59
2 3 4 59
4 5 4 59
6 7 4 59
8 9 4 59
10 11 4 59
12 13 4 59
14 15 4 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

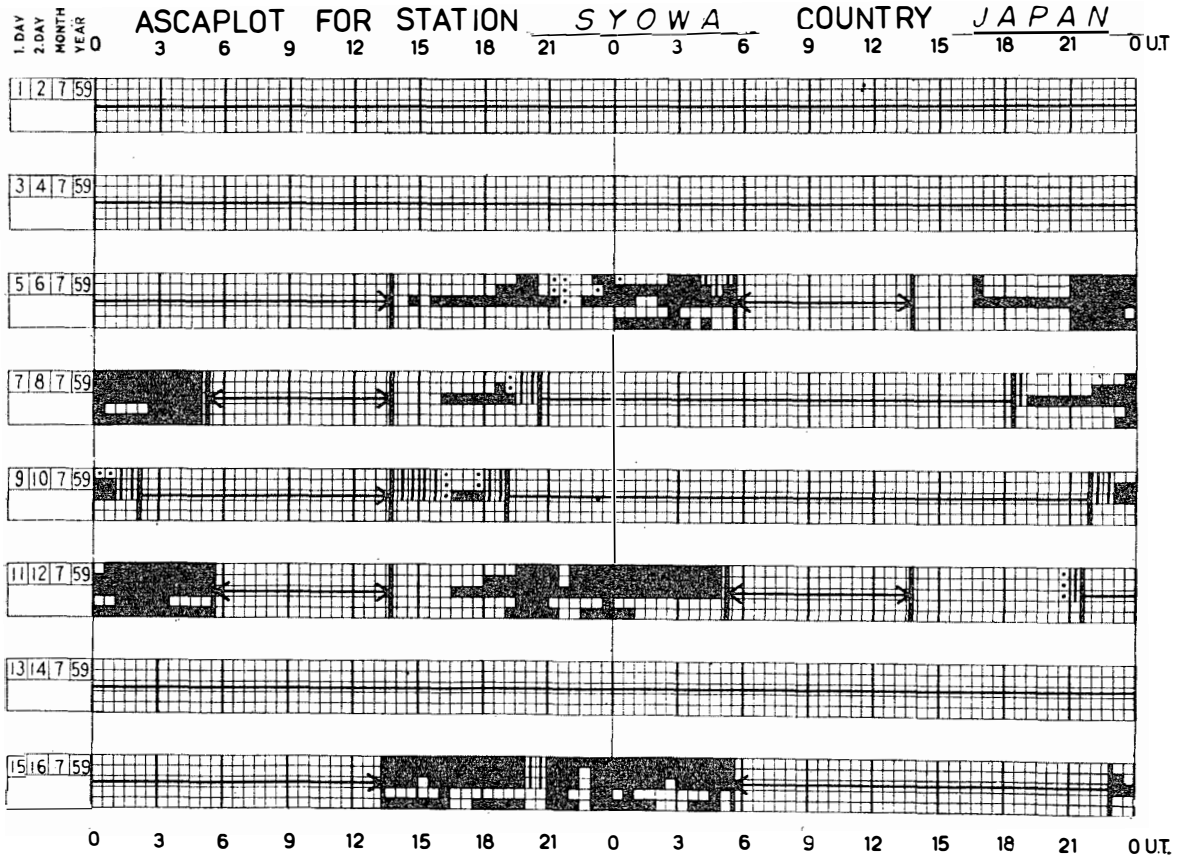

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 4 59
18 19 4 59
20 21 4 59
22 23 4 59
24 25 4 59
26 27 4 59
28 29 4 59
30 4 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

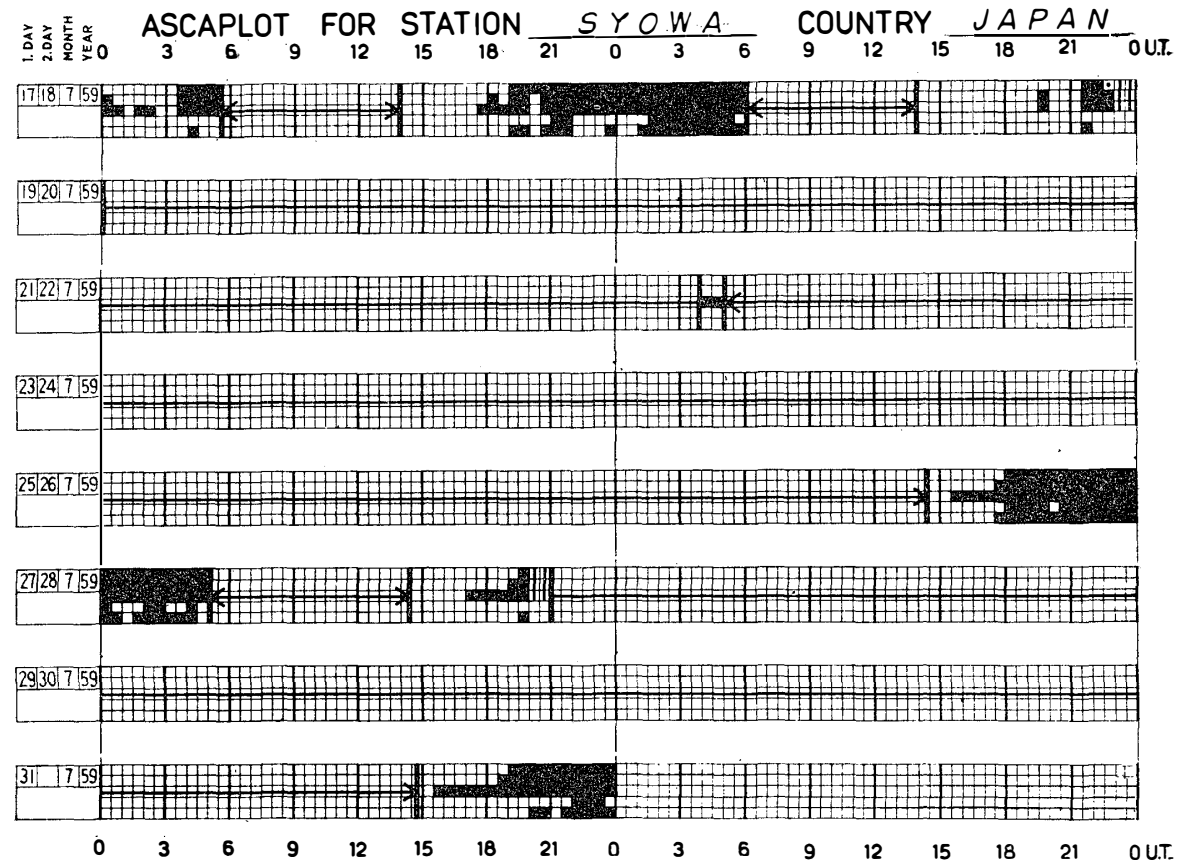

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 5 59
2 3 5 59
4 5 5 59
6 7 5 59
8 9 5 59
10 11 5 59
12 13 5 59
14 15 5 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

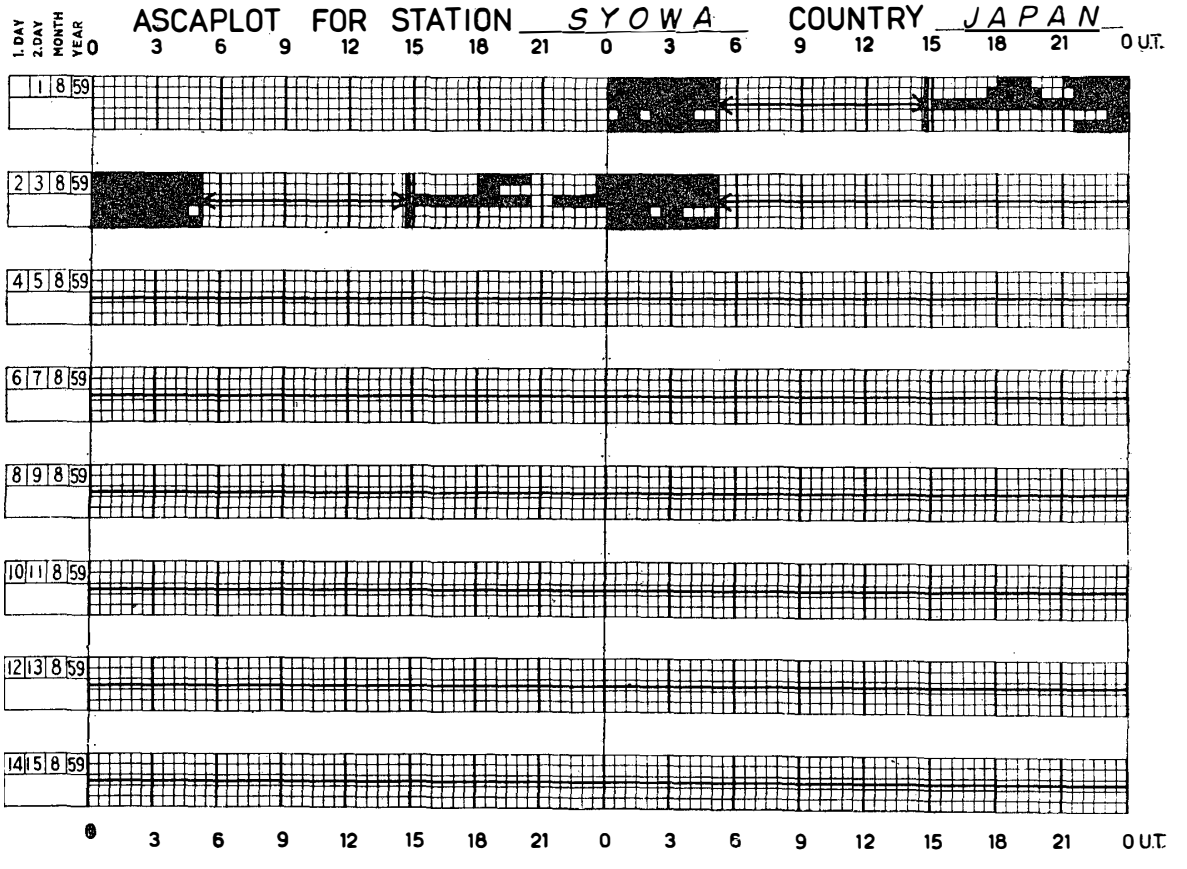

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 6 59
3 4 6 59
5 6 6 59
7 8 6 59
9 10 6 59
11 12 6 59
13 14 6 59
15 16 6 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

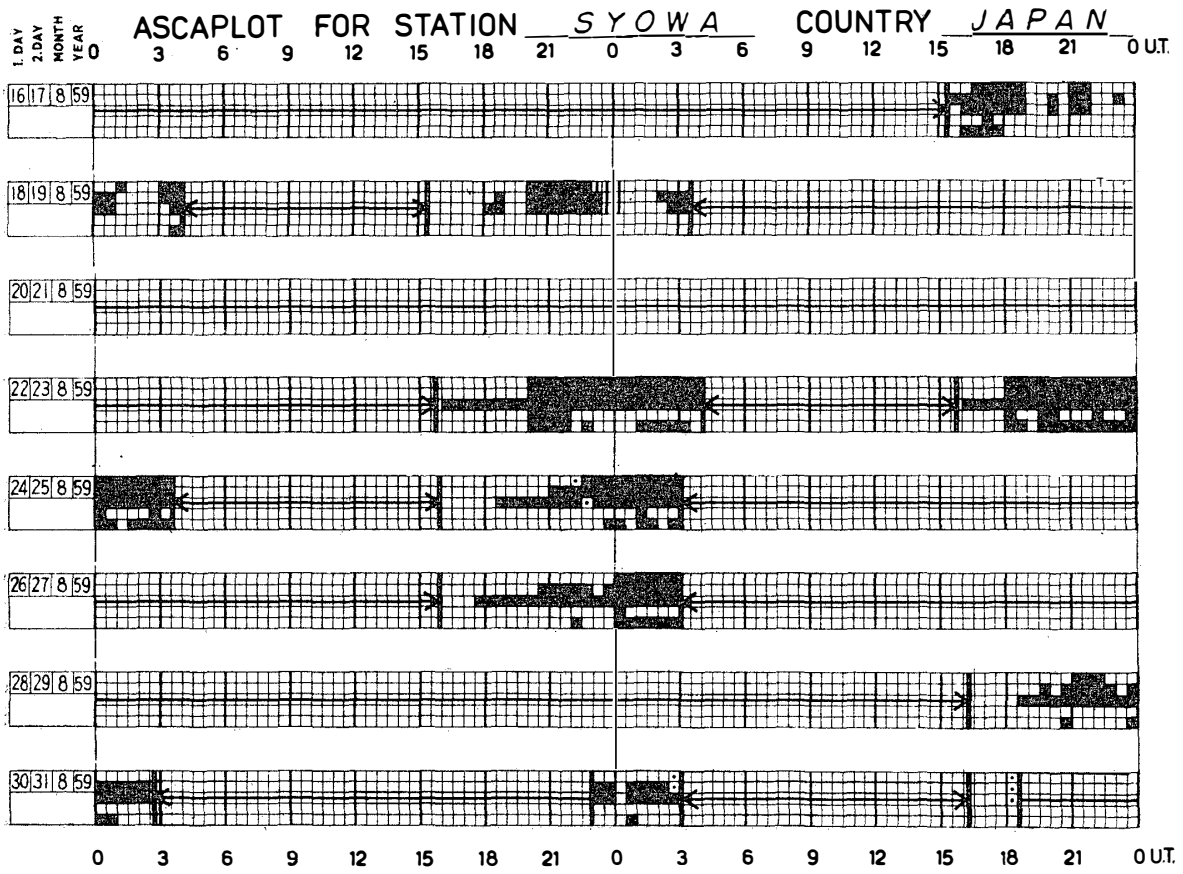

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 6 59
19 20 6 59
21 22 6 59
23 24 6 59
25 26 6 59
27 28 6 59
29 30 6 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

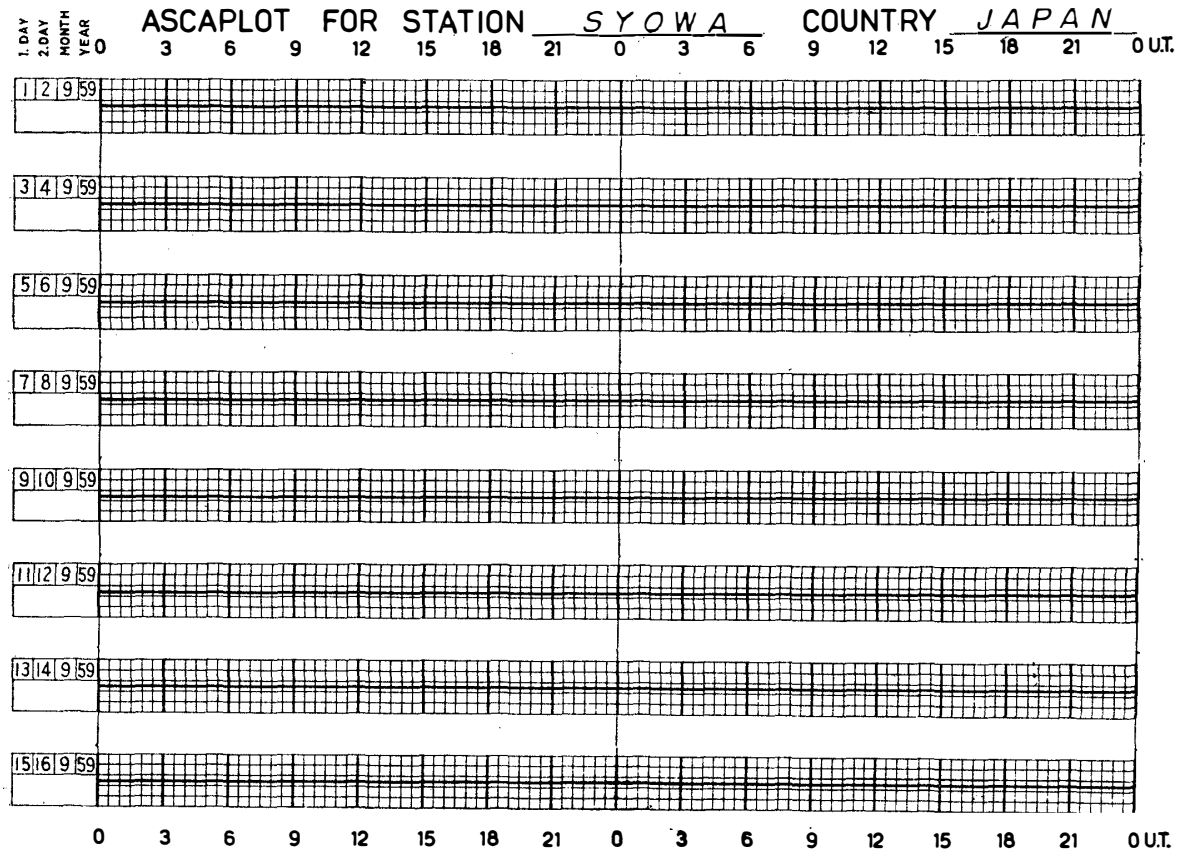

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 5 59
18 19 5 59
20 21 5 59
22 23 5 59
24 25 5 59
26 27 5 59
28 29 5 59
30 31 5 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

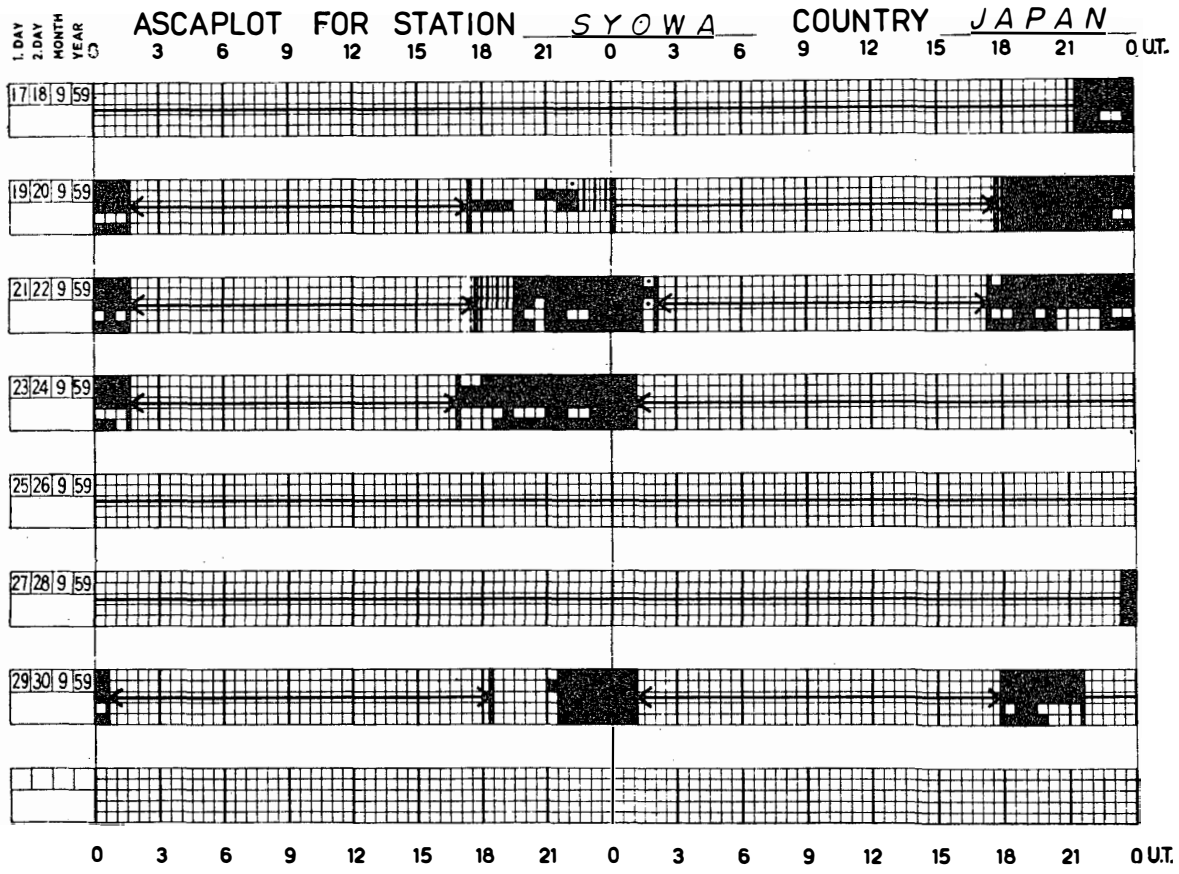

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 7 59
3 4 7 59
5 6 7 59
7 8 7 59
9 10 7 59
11 12 7 59
13 14 7 59
15 16 7 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

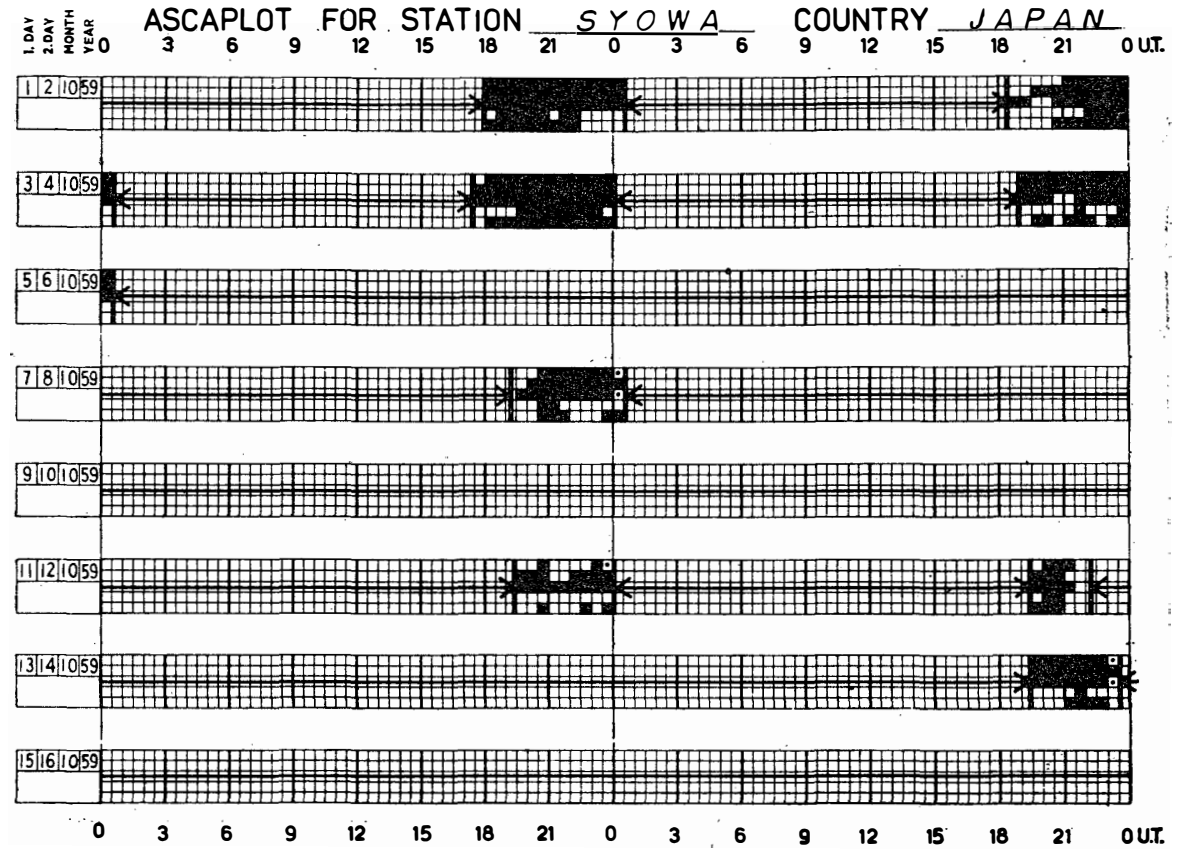

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 7 59
19 20 7 59
21 22 7 59
23 24 7 59
25 26 7 59
27 28 7 59
29 30 7 59
31 7 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

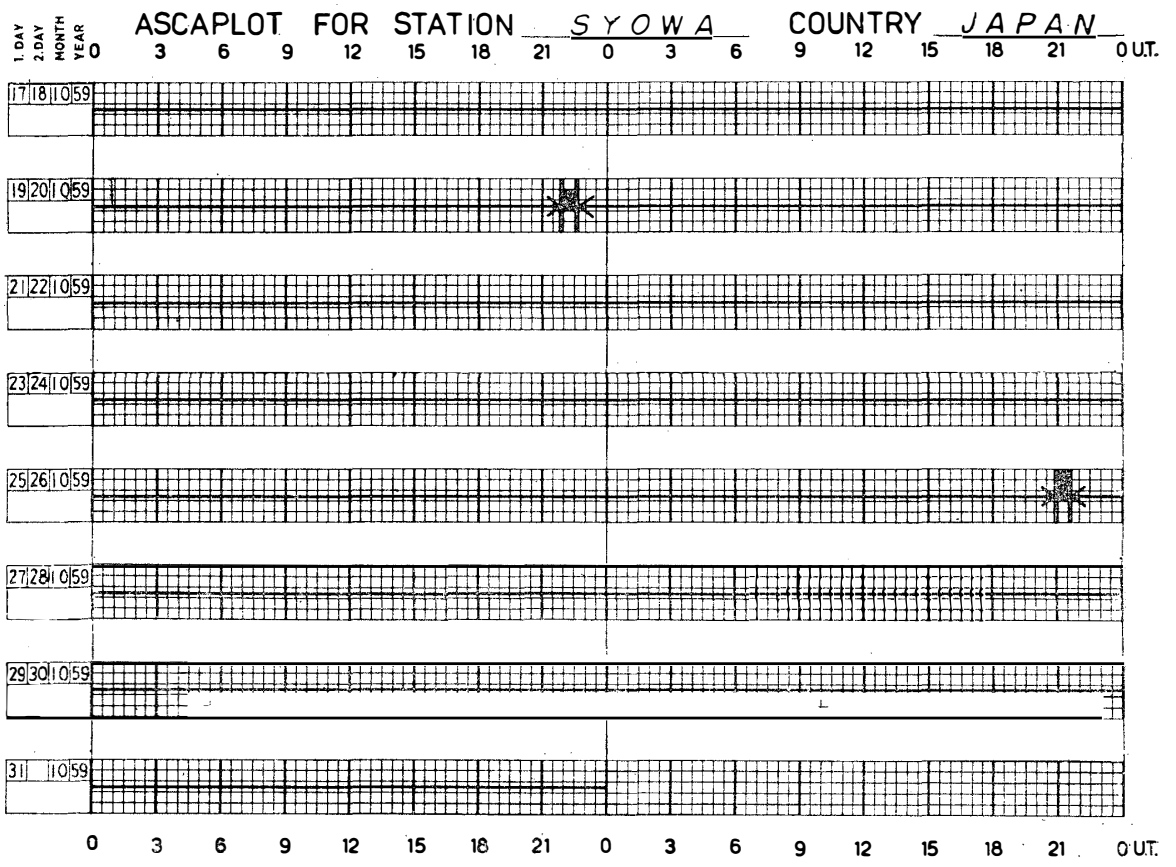

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 8 59
2 3 8 59
4 5 8 59
6 7 8 59
8 9 8 59
10 11 8 59
12 13 8 59
14 15 8 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

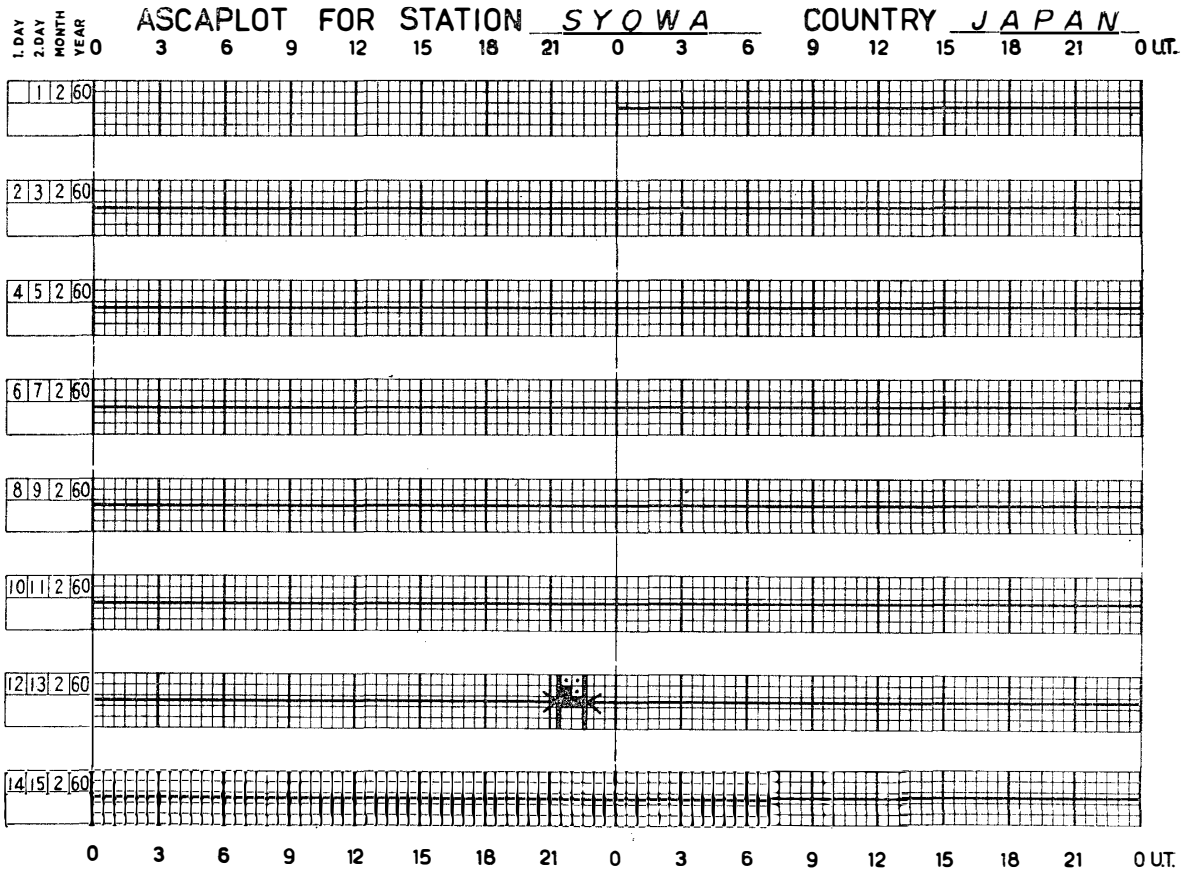

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 8 59
18 19 8 59
20 21 8 59
22 23 8 59
24 25 8 59
26 27 8 59
28 29 8 59
30 31 8 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

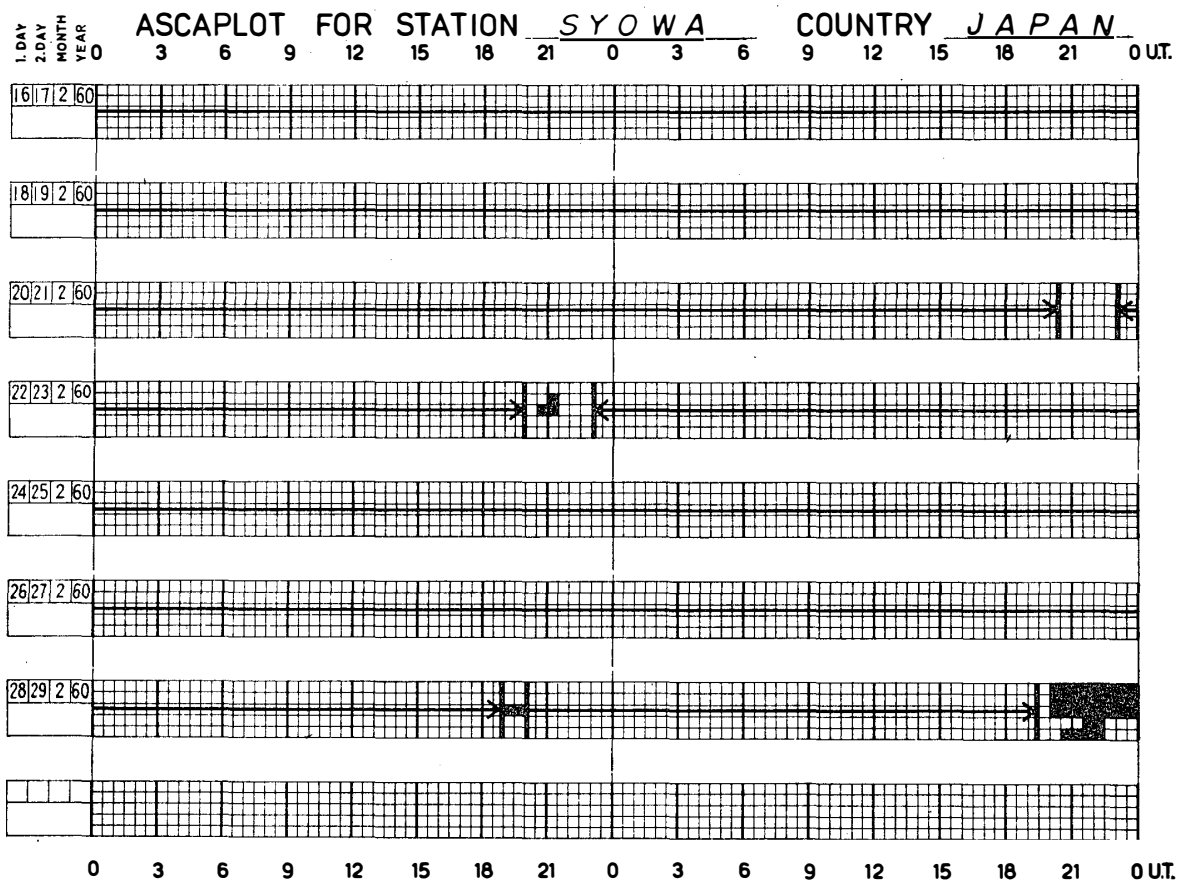

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 9 59
3 4 9 59
5 6 9 59
7 8 9 59
9 10 9 59
11 12 9 59
13 14 9 59
15 16 9 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

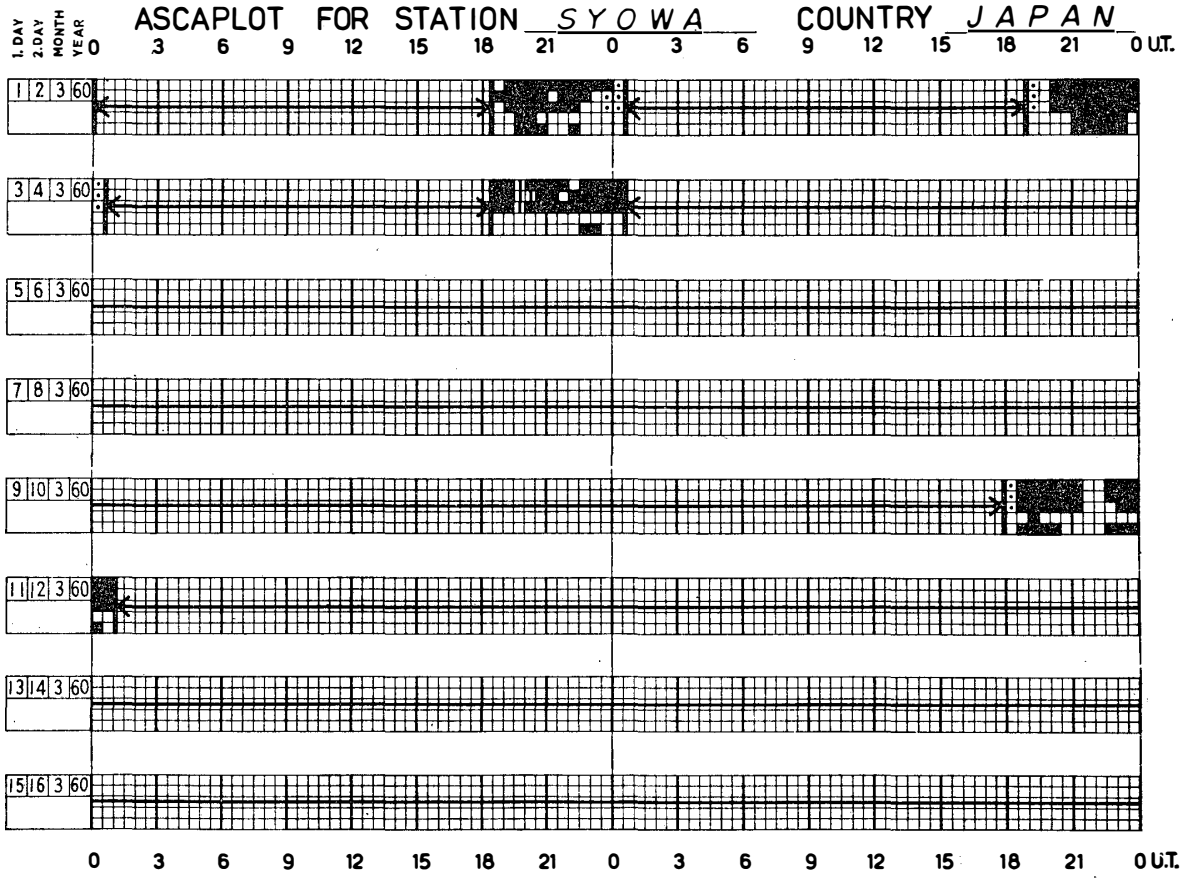

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 9 59
19 20 9 59
21 22 9 59
23 24 9 59
25 26 9 59
27 28 9 59
29 30 9 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

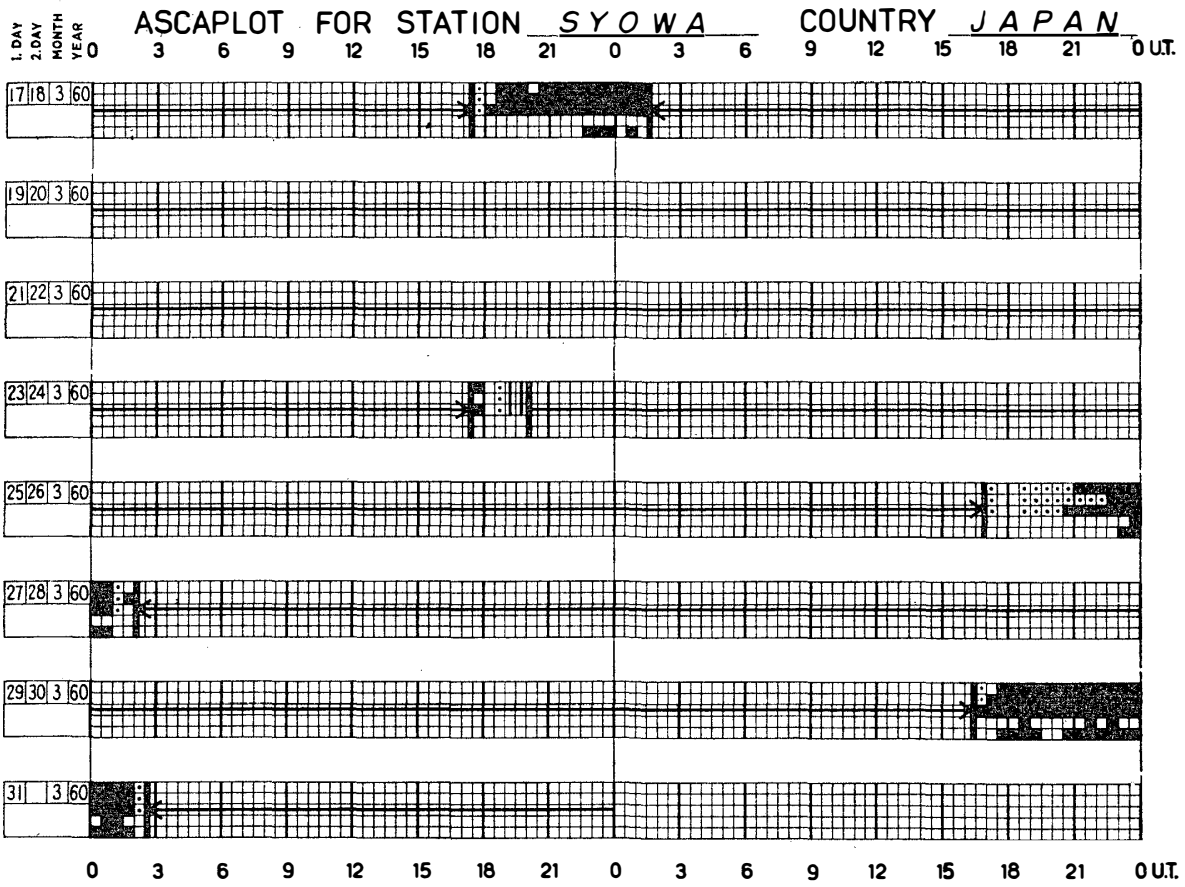

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 10 59
3 4 10 59
5 6 10 59
7 8 10 59
9 10 10 59
11 12 10 59
13 14 10 59
15 16 10 59
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

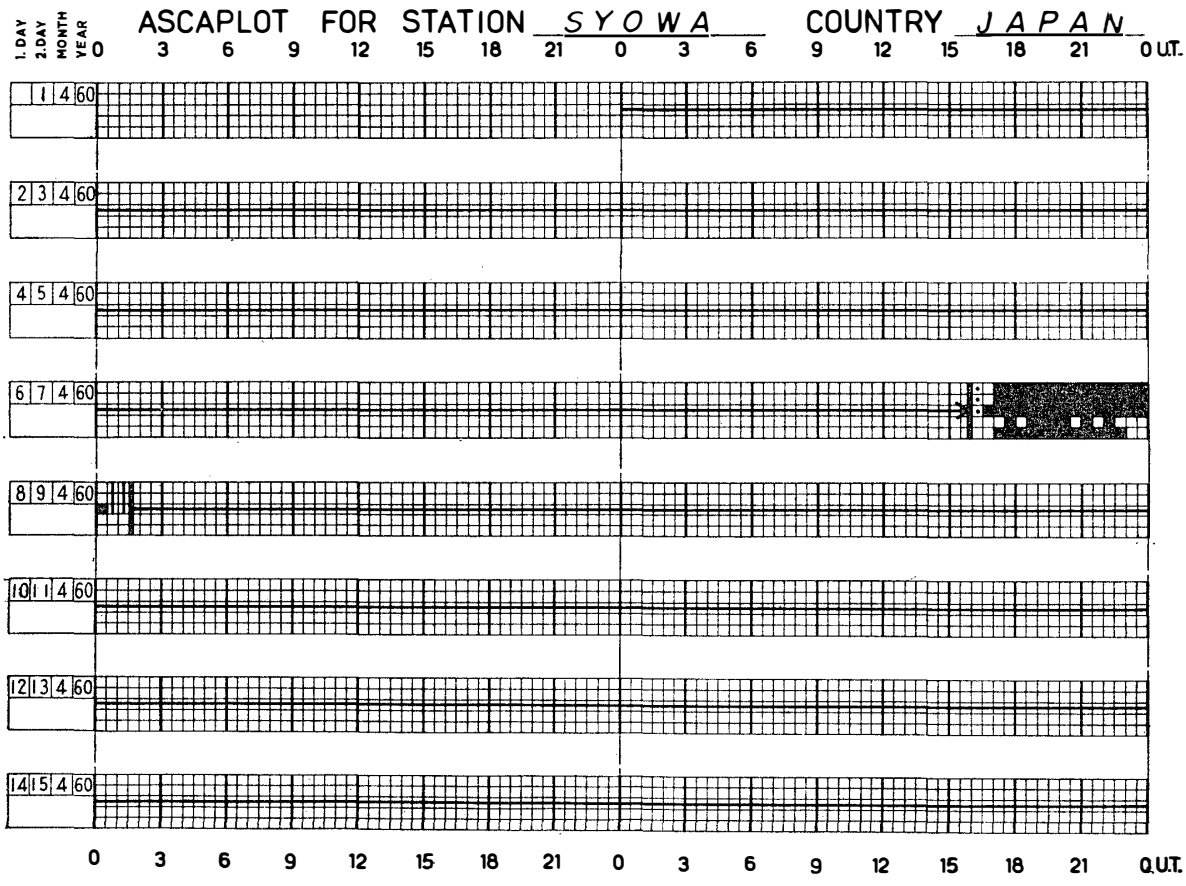

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 10 59
19 20 10 59
21 22 10 59
23 24 10 59
25 26 10 59
27 28 10 59
29 30 10 59
31 10 59

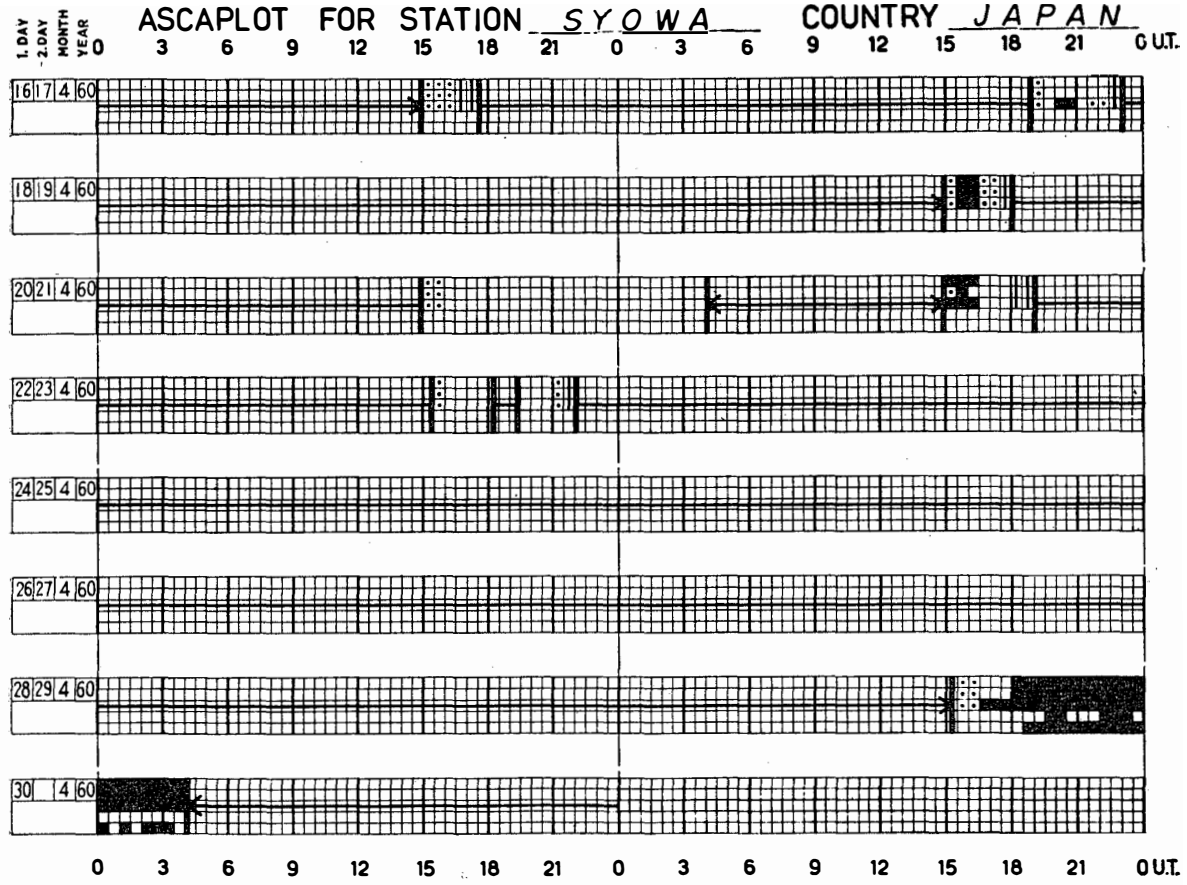

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 60
2 3 2 60
4 5 2 60
6 7 2 60
8 9 2 60
10 11 2 60
12 13 2 60
14 15 2 60

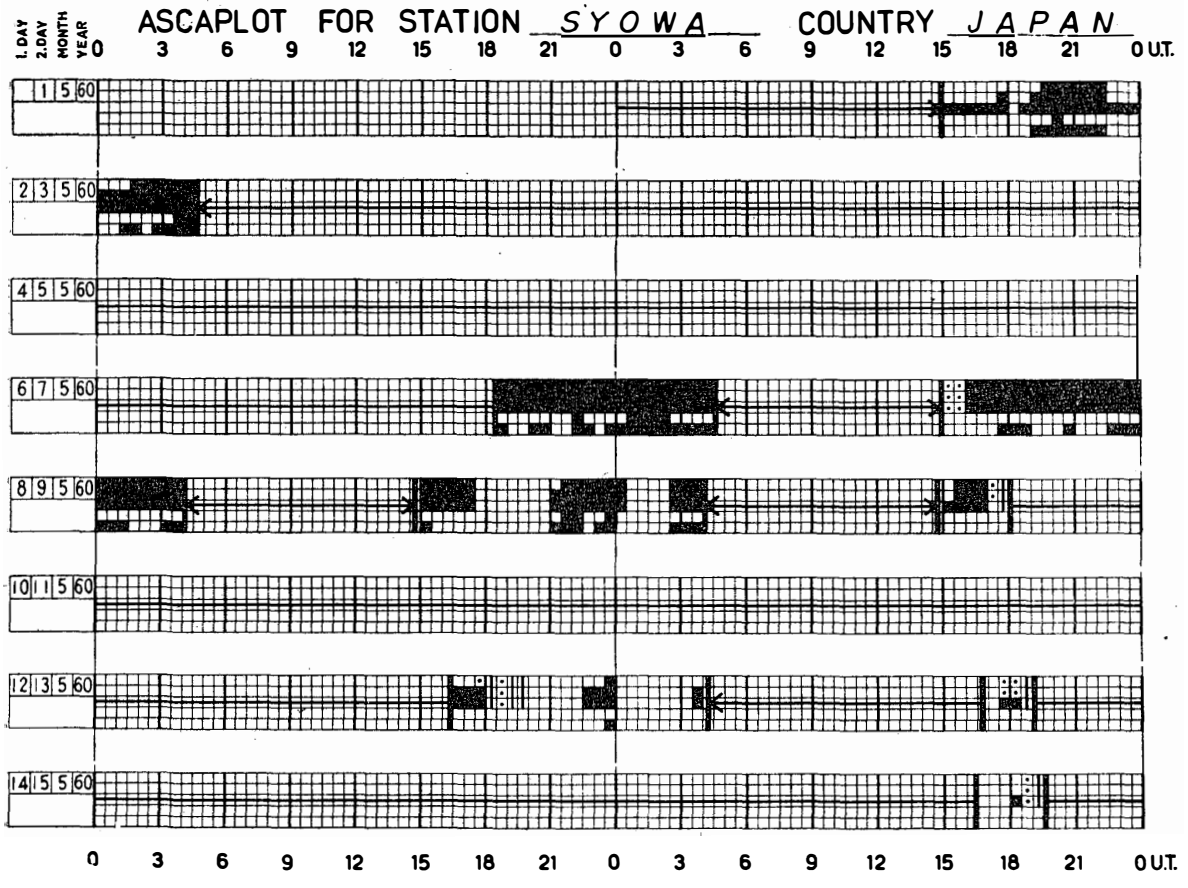

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 2 60
18 9 2 60
20 21 2 60
22 23 2 60
24 25 2 60
26 27 2 60
28 29 2 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

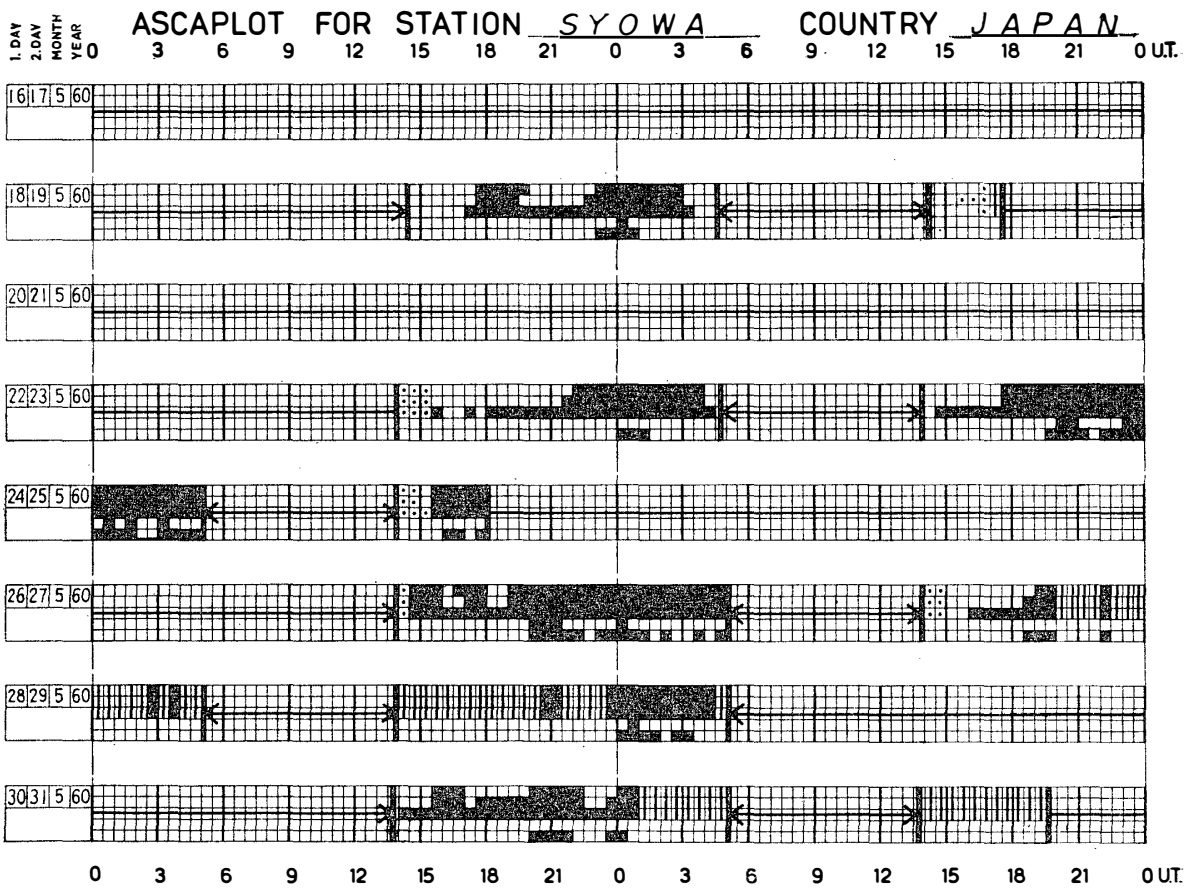

1.DAY
2.DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 3 60
3 4 3 60
5 6 3 60
7 8 3 60
9 10 3 60
11 12 3 60
13 14 3 60
15 16 3 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

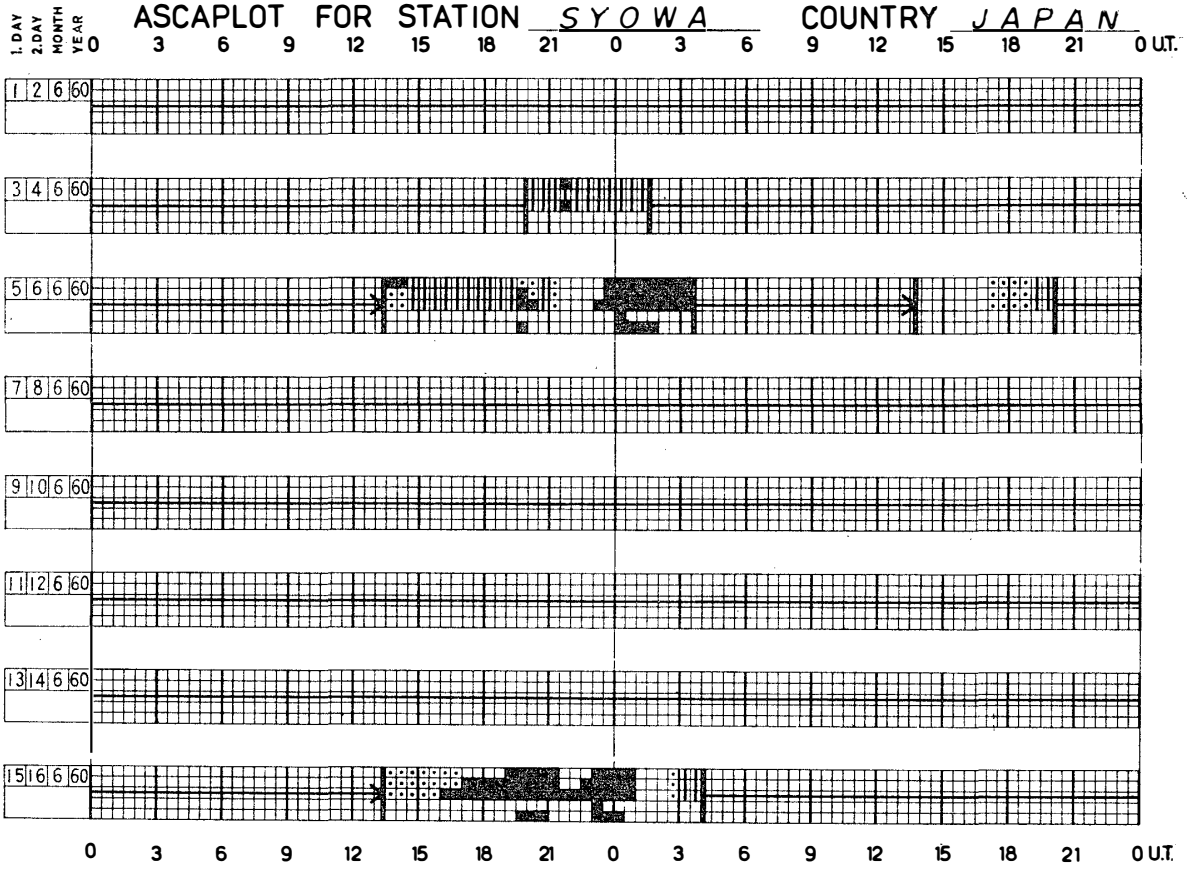

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 3 60
19 20 3 60
21 22 3 60
23 24 3 60
25 26 3 60
27 28 3 60
29 30 3 60
31 3 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

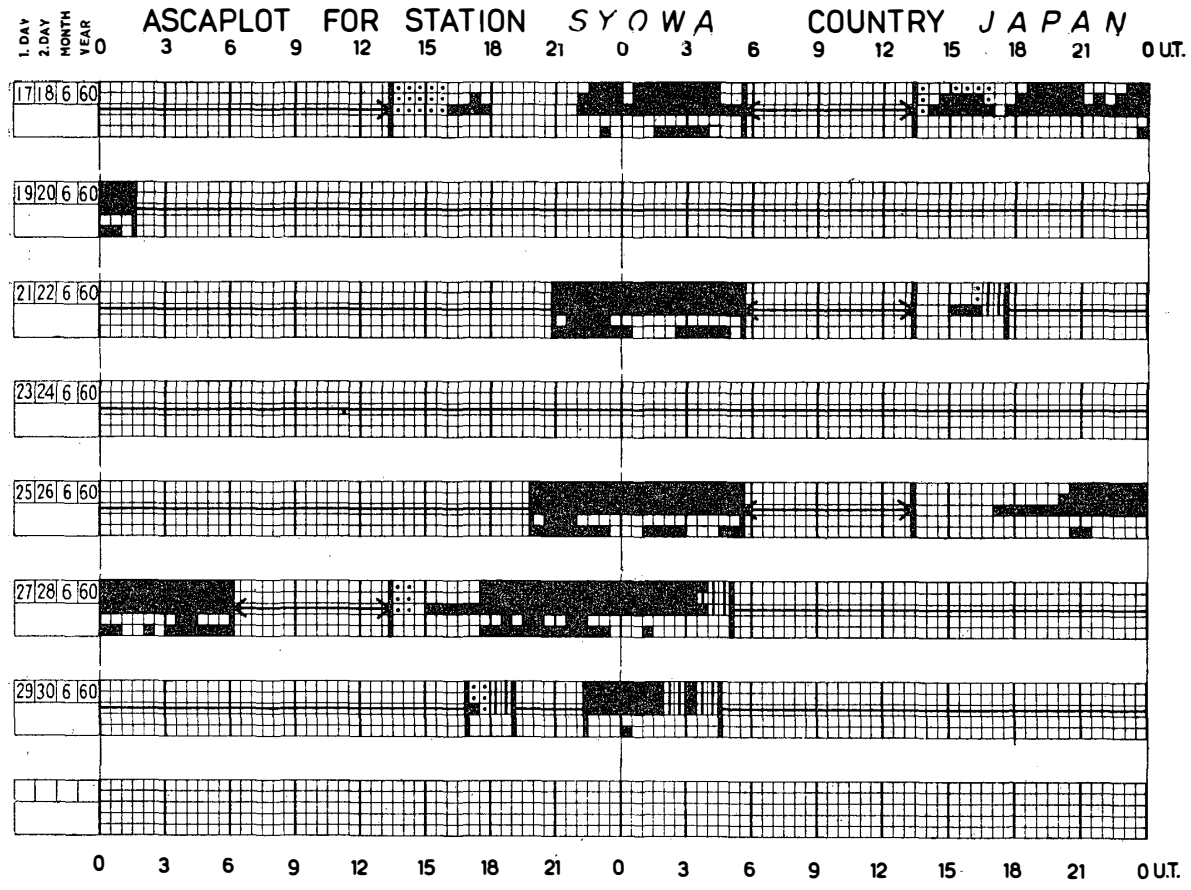

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 4 60
2 3 4 60
4 5 4 60
6 7 4 60
8 9 4 60
10 11 4 60
12 13 4 60
14 15 4 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

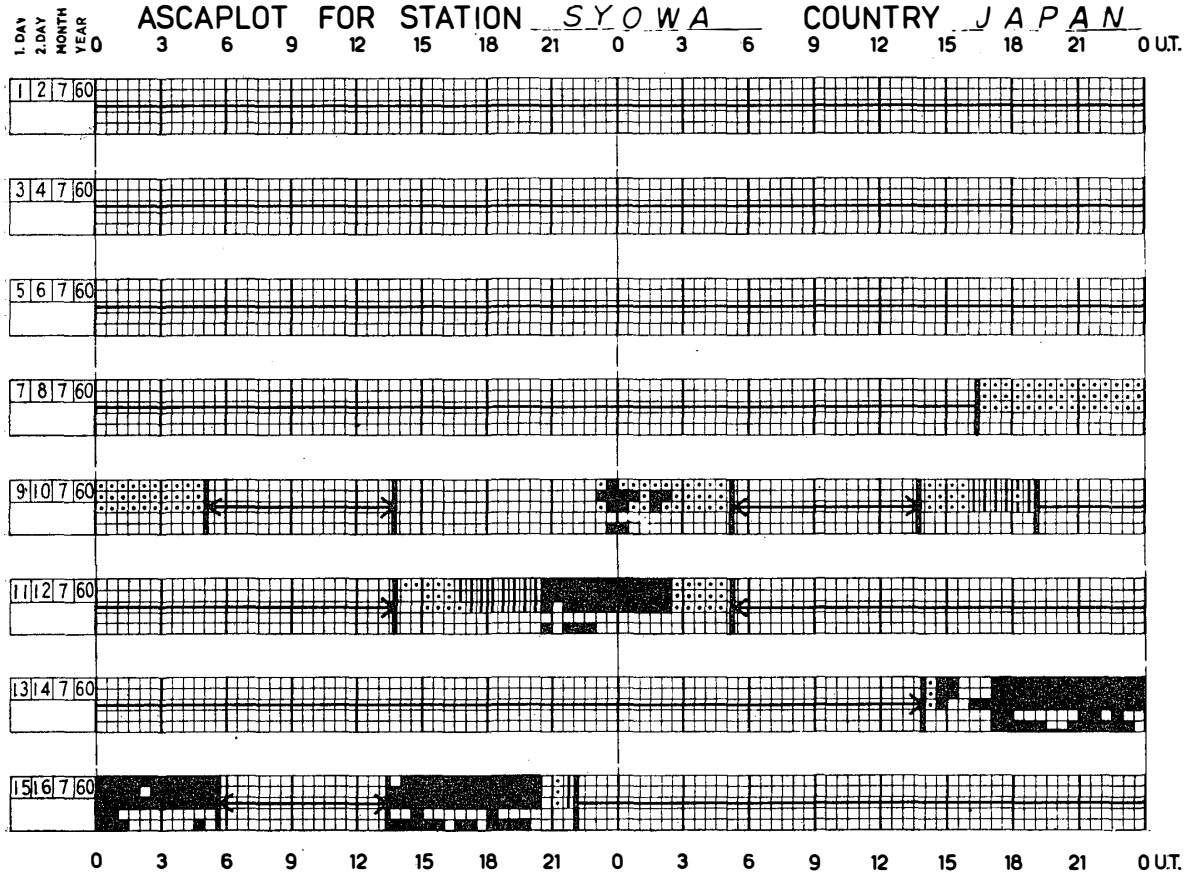

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 4 60
18 19 4 60
20 21 4 60
22 23 4 60
24 25 4 60
26 27 4 60
28 29 4 60
30 4 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

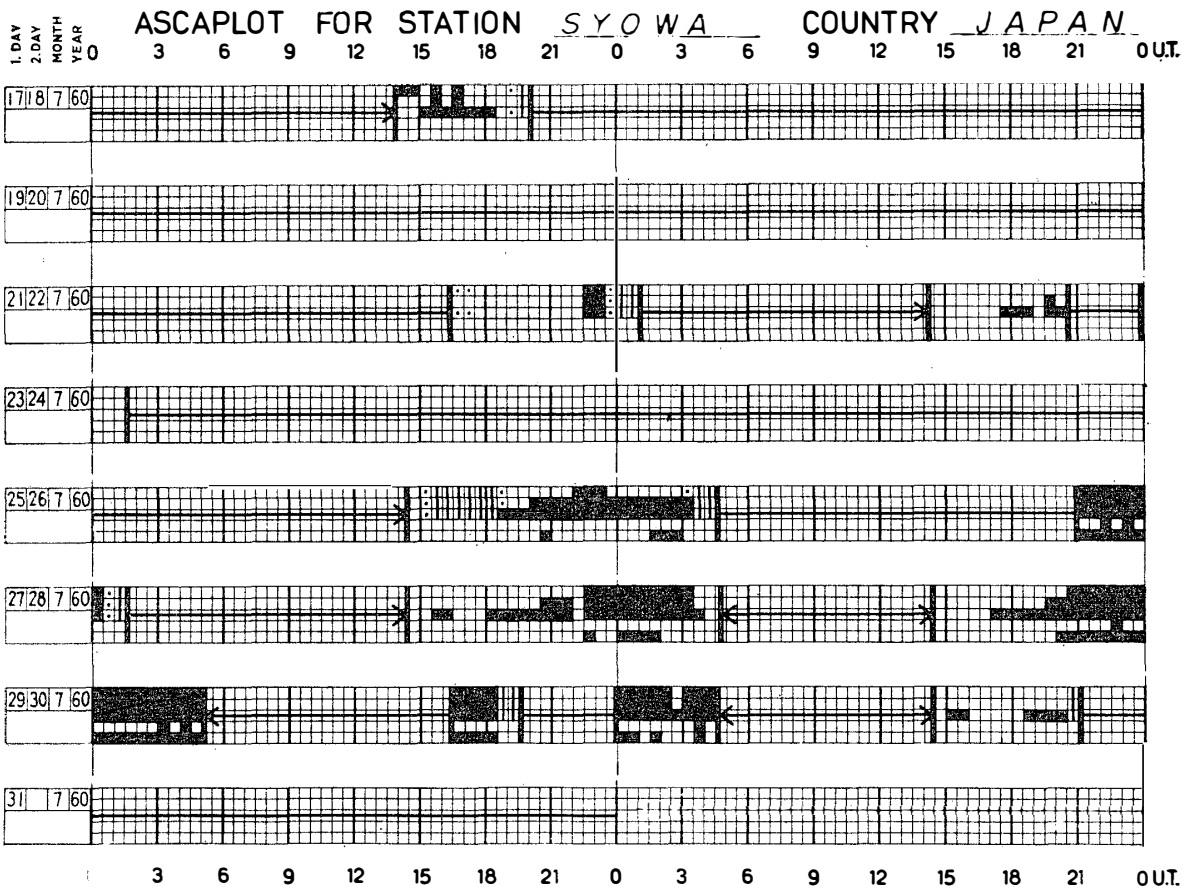

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 5 60
2 3 5 60
4 5 5 60
6 7 5 60
8 9 5 60
10 11 5 60
12 13 5 60
14 15 5 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

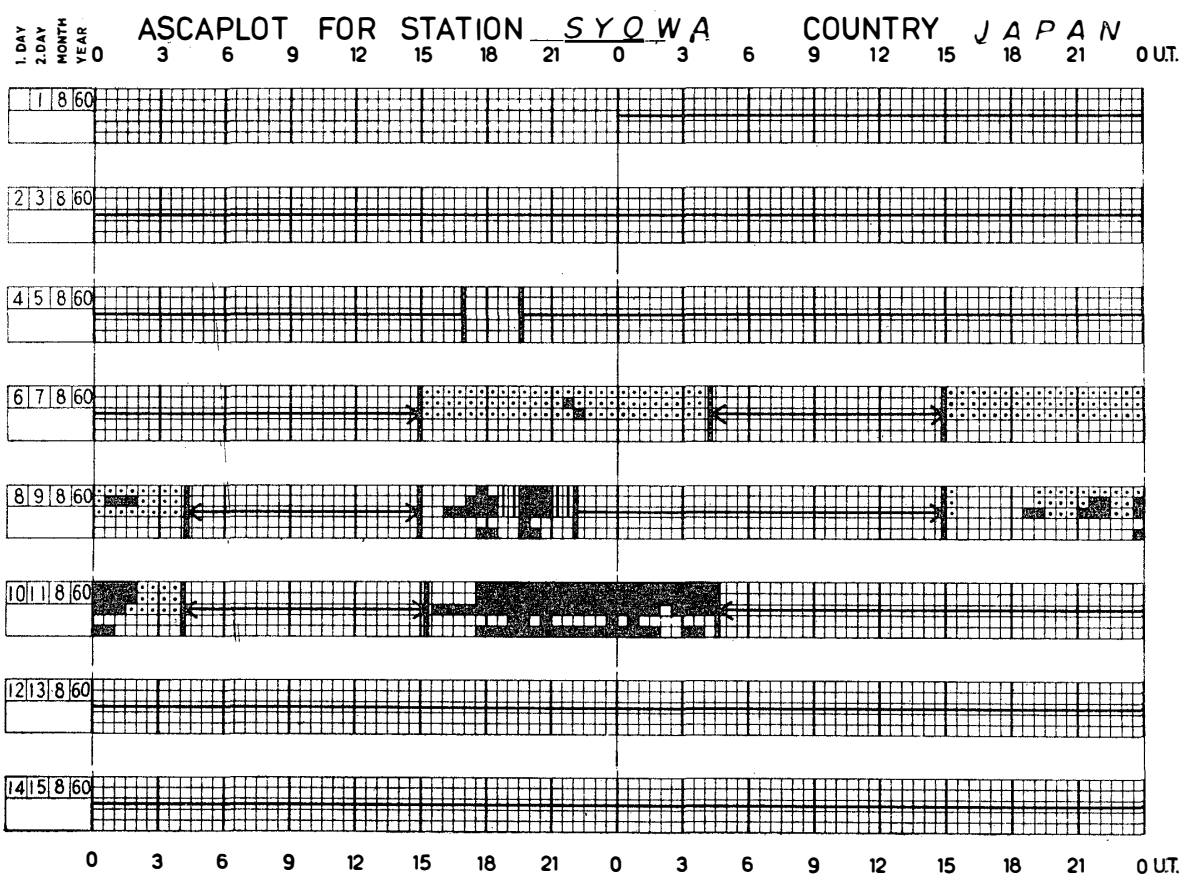

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 5 60
18 19 5 60
20 21 5 60
22 23 5 60
24 25 5 60
26 27 5 60
28 29 5 60
30 31 5 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

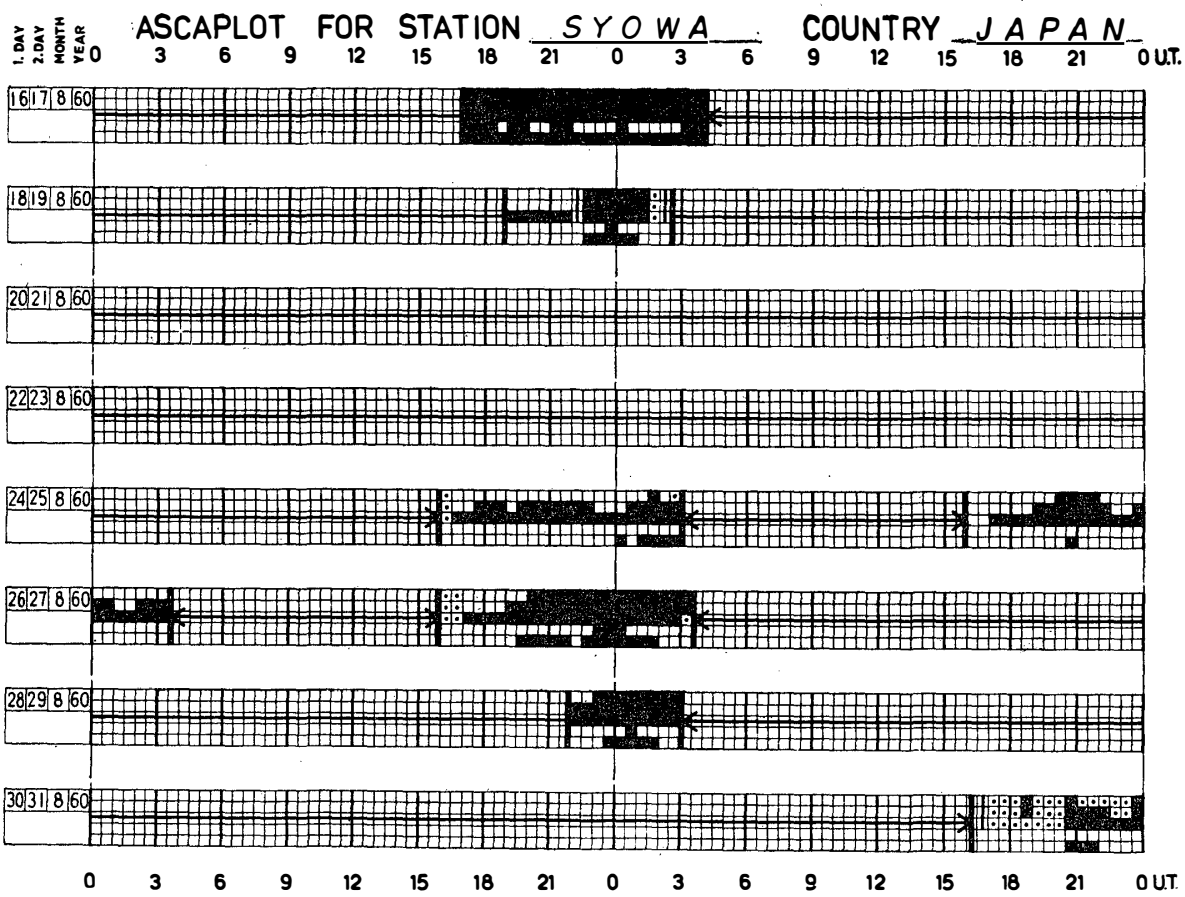

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 6 60
3 4 6 60
5 6 6 60
7 8 6 60
9 10 6 60
11 12 6 60
13 14 6 60
15 16 6 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

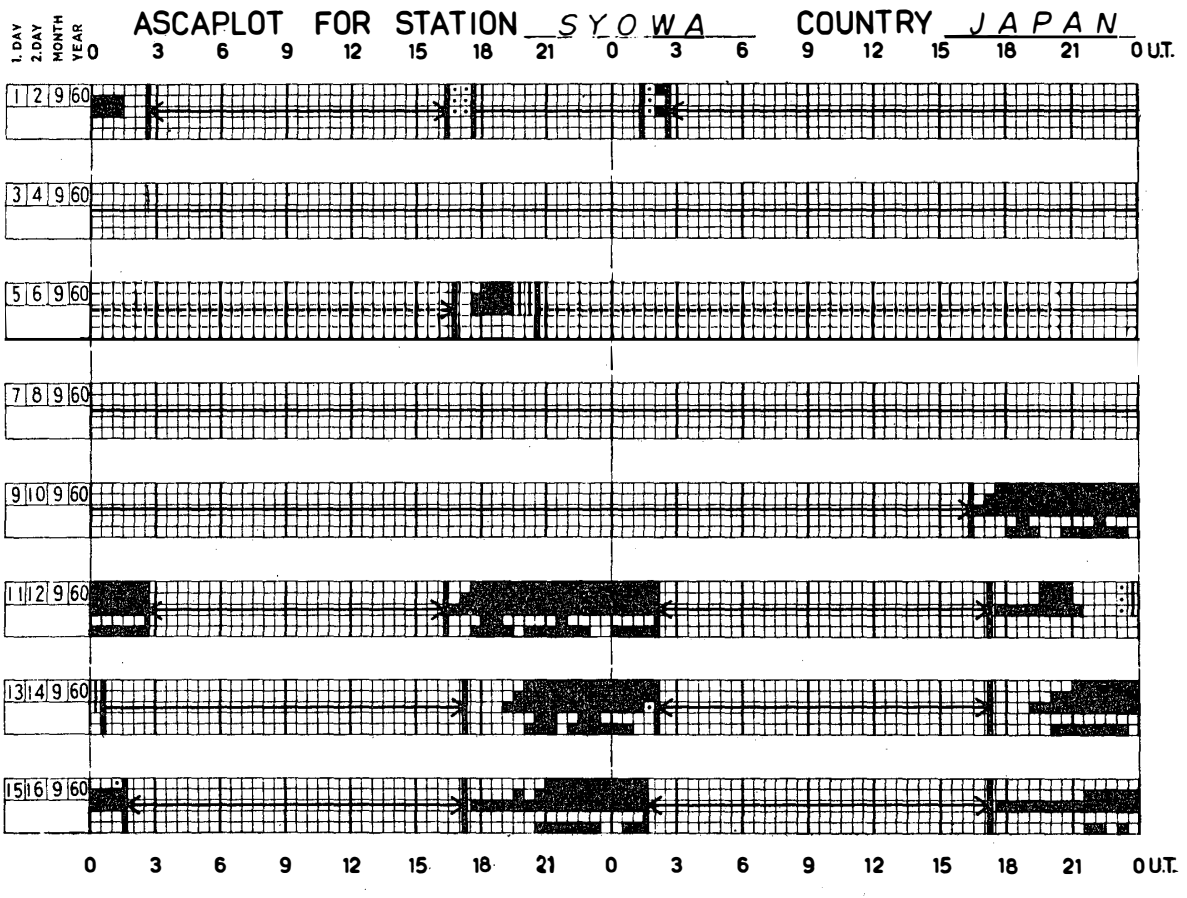

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 6 60
19 20 6 60
21 22 6 60
23 24 6 60
25 26 6 60
27 28 6 60
29 30 6 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

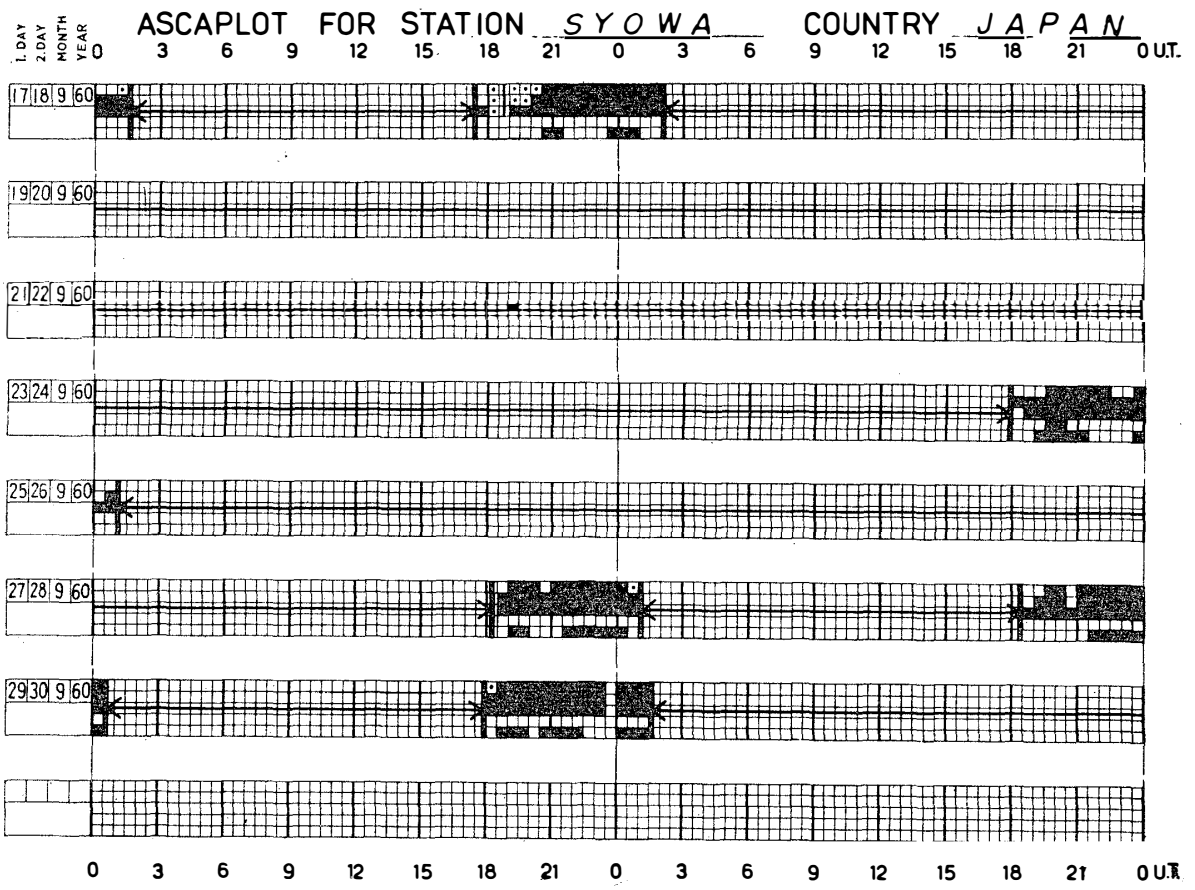

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 7 60
3 4 7 60
5 6 7 60
7 8 7 60
9 10 7 60
11 12 7 60
13 14 7 60
15 16 7 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.

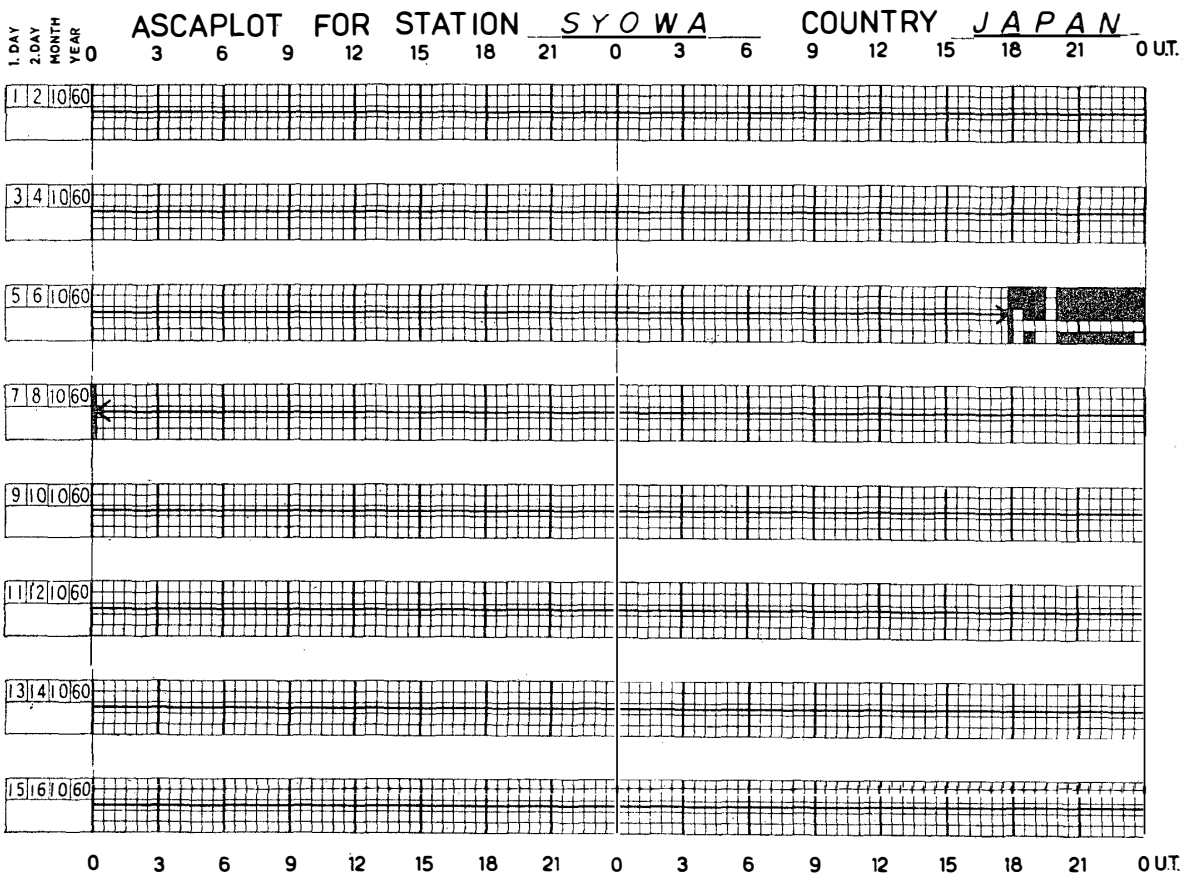

1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
17 18 7 60
19 20 7 60
21 22 7 60
23 24 7 60
25 26 7 60
27 28 7 60
29 30 7 60
31 7 60
3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.


1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 8 60
2 3 8 60
4 5 8 60
6 7 8 60
8 9 8 60
10 11 8 60
12 13 8 60
14 15 8 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.


1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
16 17 8 60
18 19 8 60
20 21 8 60
22 23 8 60
24 25 8 60
26 27 8 60
28 29 8 60
30 31 8 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.


1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.
1 2 9 60
3 4 9 60
5 6 9 60
7 8 9 60
9 10 9 60
11 12 9 60
13 14 9 60
15 16 9 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 U.T.


1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 UT.
17 18 9 60
19 20 9 60
21 22 9 60
23 24 9 60
25 26 9 60
27 28 9 60
29 30 9 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 UT.


1. DAY
2. DAY
MONTH
YEAR
ASCAPLOT FOR STATION SYOWA COUNTRY JAPAN
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 UT.
1 2 10 60
3 4 10 60
5 6 10 60
7 8 10 60
9 10 10 60
11 12 10 60
13 14 10 60
15 16 10 60
0 3 6 9 12 15 18 21 0 3 6 9 12 15 18 21 0 UT.