G3-25-1

Sunrise-Sunset Maps

* FATHER JACK PEJZA *

As every good DXer knows, the path of the skywave part of a radio signal must be entirely in darkness in order to provide as good a path as possible between transmitter and receiver. More accurately, the point in the ionosphere where the waves refrac must be in darkness, to allow the ions to recombine and thus let the signal through. For practical purposes, however, it is sufficient to say that both transmitter and receiver must be in darkness.

A DXer in Southern California, for instance, can pick up Chicago stations very easily after sunset, but during the day he can receive only stations within a groundwave range of a few hundred miles.

So it is important for a DXer to know where darkness exists if he wants to hear DX. The DXer in Illinois, for instance, is more likely to hear a daytime station in Pennsylvania signing on than off. He is also more likely to hear a daytime station in California signing off than on. In both cases, it is because a darkness path exists between him and the station.

The hours of darkness do not remain the same all year round. In winter, a DXer experiences an earlier sunset and a later sunrise, thus giving him more hours to DX. This is because of the changing angle of the sun. As the earth goes around the sun, its ax s always points to the same spot in space; but since the axis is tilted 23½° to the plane of the orbit around the sun, the sun appears to change its height in the sky, and the length of day and night change. The difference between the length of day in various seasons depends on a DXer's location north or south of the equator. The farther away from the equator you are, the bigger the difference will be between winter and summer. For instance, north of the Arctic Circle, the sun never sets around June 21; instead it stays above the horizon, dipping lower at midnight, but still in the sky. On the other hand, around December 21, the sun never rises at a spot north of the Arctic Circle. So the change from winter to summer is from no sunlight to 24 hours of light.

At the equator, the sun would appear in the northern sky on June 21 and in the southern sky on December 21, but never more than 23½° from the zenith (the spot directly above the viewer). The difference between the length of day and night is very small, no more than 15 minutes from winter to summer.

For most of us, somewhere in between the North Pole and the equator, there will be a noticeable change in the length of day throughout the year. The farther north you live, the more change. But to determine exactly when sunrise or sunset will occur, you have to consult a table of sunrise/sunset times or a map showing the same. And that's the purpose of this set of maps.

There are a couple of other reasons why a knowledge of SR/SS times is handy. First, many U.S. stations either are licensed to operate only during daylight hours, or at least must change power (and in some cases, antenna pattern) at night. But the F.C.C. doesn't make a station change exactly at sunrise or sunset; instead it allows stations to use the time of sunset or sunrise on the 15th of the month for that entire month. For instance, sunset in Chicago is at about 1745 EST on the 15th of October; any daytimer there would have to sign-off at that time throughout the entire month. During the first part of October, sunset in Chicago actually occurs after 1745, so the station is signing off in daylight; however for the last half of the month sign-off would occur after sunset, thus giving DXers to the east a chance to hear it.

The reverse would be true in February. A station would sign off before sunset during the first part of the month and after sunset during the last part of the month.

Since daytime stations are licensed to begin operations at 0600 local time, sometimes they will begin broadcasting before sunrise. By knowing the time of sunrise, sometimes you can pick up such a station.

There's another reason why SR/SS times are important. Sometimes interfering stations will pass in to sunlight before the desired station, thus clearing the way for the reception of the wanted station. For instance, suppose a Midwest DXer is getting interference from a New York station while he wants to hear a Colombian on the same frequency. Winter would not be the best time to try for the Colombian, since sunrise occurs in Bogota before it does in New York. However, six months later, sunrise in New York occurs at 0431 EST, while it happens at 0549 EST in Colombia. Thus a DXer might have over an hour of interference-free reception, all other factors being equal.

To take another example: suppose a Colorado DXer wants to try for the Chinese powerhouse on 1040, but gets too much interference from WHO, Des Moines, IA. If he waits until sunrise in Des Moines, the Chinese station might be heard clearly without interference.

Two other cases of this have brought in some extremely good and rare DX in the summer, when conditions otherwise are very poor, especially for East Coasters. EC DXers have heard stations in South Africa when interference from European stations has been eliminated by sunlight. In a similar way, West Coasters have heard stations in South America below the equator (Chile, Peru) after interference from North American eastern stations has been eliminated.

So it helps to know when sunset and sunrise occur at various places throughout the world in different seasons. Since the angles of the sunrise and sunset lines change throughout the year, a map for each month is necessary. These maps include two for each month: one for the entire world, and one for North America. The world-wide maps have been prepared by Father Jack Pejza; the U.S. maps by Ernie Wesolowski. The worldwide maps have times of sunrise and sunset shown in GMT.
The domestic set have only the last digits of the time shown, sot that the DXer can use a time system which is convenient to him (either EST, his own time zone, or GMT).

The following table will enable the DXer to write in the correct time on the domestic maps. Start with the area of central Maine and proceed westward, adding one hour at each double zero. Be sure to doublecheck your hours before you begin.

MONTH	EST LSR	EST LSS	HONOLULU
January	0715	1615	2245
February	0645	1700	2300
March	0545	1745	2315
April	0445	1830	2315
May	0415	1900	2330
June	0345	1930	2345
July	0400	1915	2345
August	0430	1845	2330
September	0515	1745	2300
October	0600	1645	2230
November	0630	1600	2215
December	0715	1600	2215

To change these EST times to other time zones, use the following conversions:

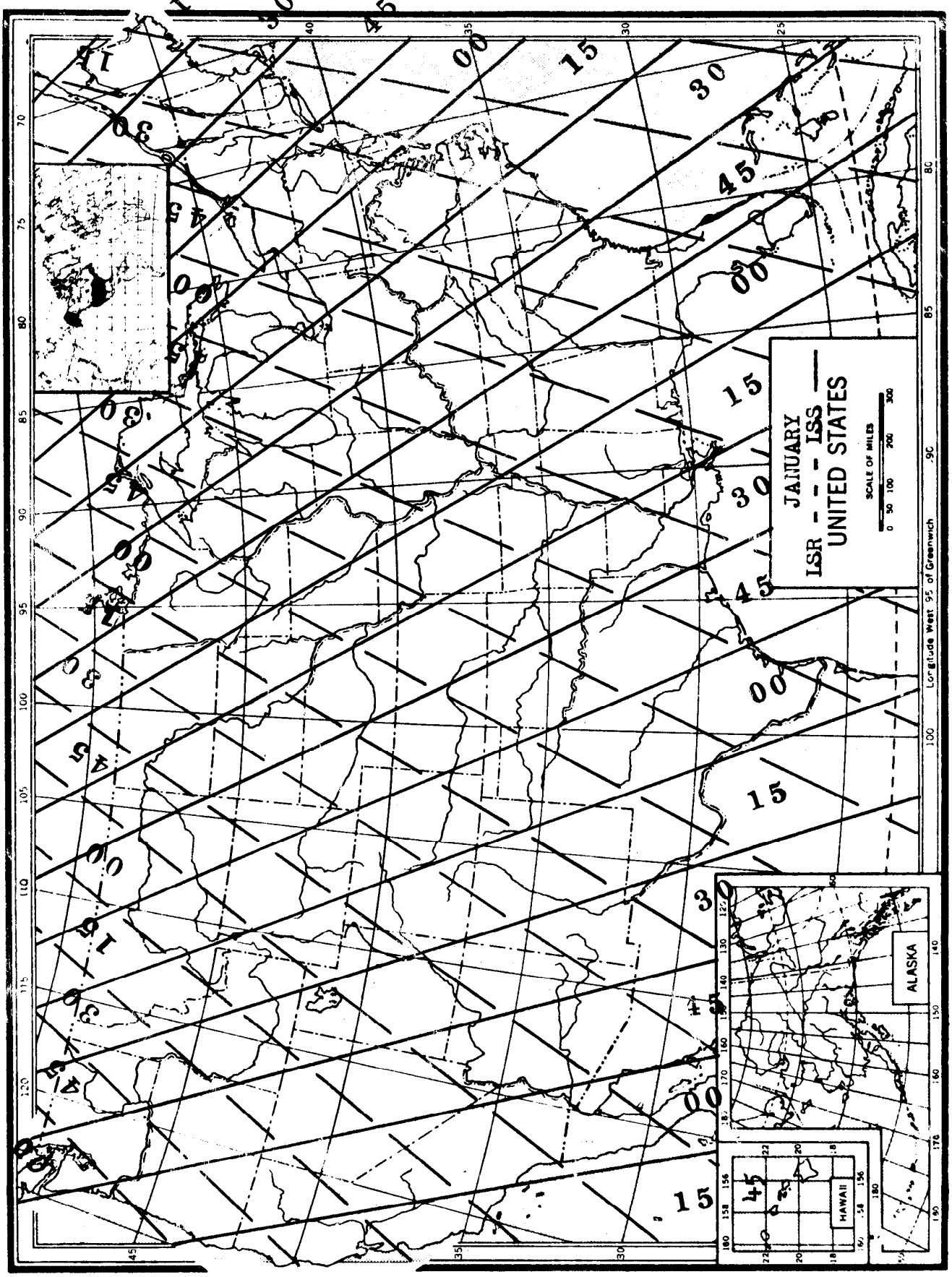
GMT	add 5 hours	(e.g., Jan. LSR = 1215 GMT)
AST	add 1 hour	(e.g., Jan. LSR = 0815 AST)
CST	subtract 1 hour	(e.g., Jan. LSR = 0615 CST)
MST	subtract 2 hours	(e.g., Jan. LSR = 0515 MST)
PST	subtract 3 hours	(e.g., Jan. LSR = 0415 PST)
HST	subtract 5 hours	(e.g., Jan. LSR = 0215 HST)

To convert Standard time to Daylight Time, add one hour. (e.g., July sunrise in Maine = 0500 EDT).

Both sets of maps show the lines of SR/SS on the fifteenth of the month. Near the beginning or end of each month, approximate times of actual sunrise and sunset can be found by comparing the times on the two adjacent maps. For instance, for August 1, use the July 15 and August 15 maps to interpolate to the times of SR/SS.

The domestic maps are accurate to within 10 miles of true average times. The worldwide maps are accurate to about 15 minutes; these should be sufficient for most purposes. For more accurate values of the times of sunrise and sunset, tables are published, such as Useful Tables from the American Practical Navigator, published by the U.S.Hydrologic Office, and printed by the U.S. Government Printing Office, Washington, DC 20402. Such tables are available as an IRCA reprint. 65

G3-25-2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ISR - - - ISS
UNITED STATES
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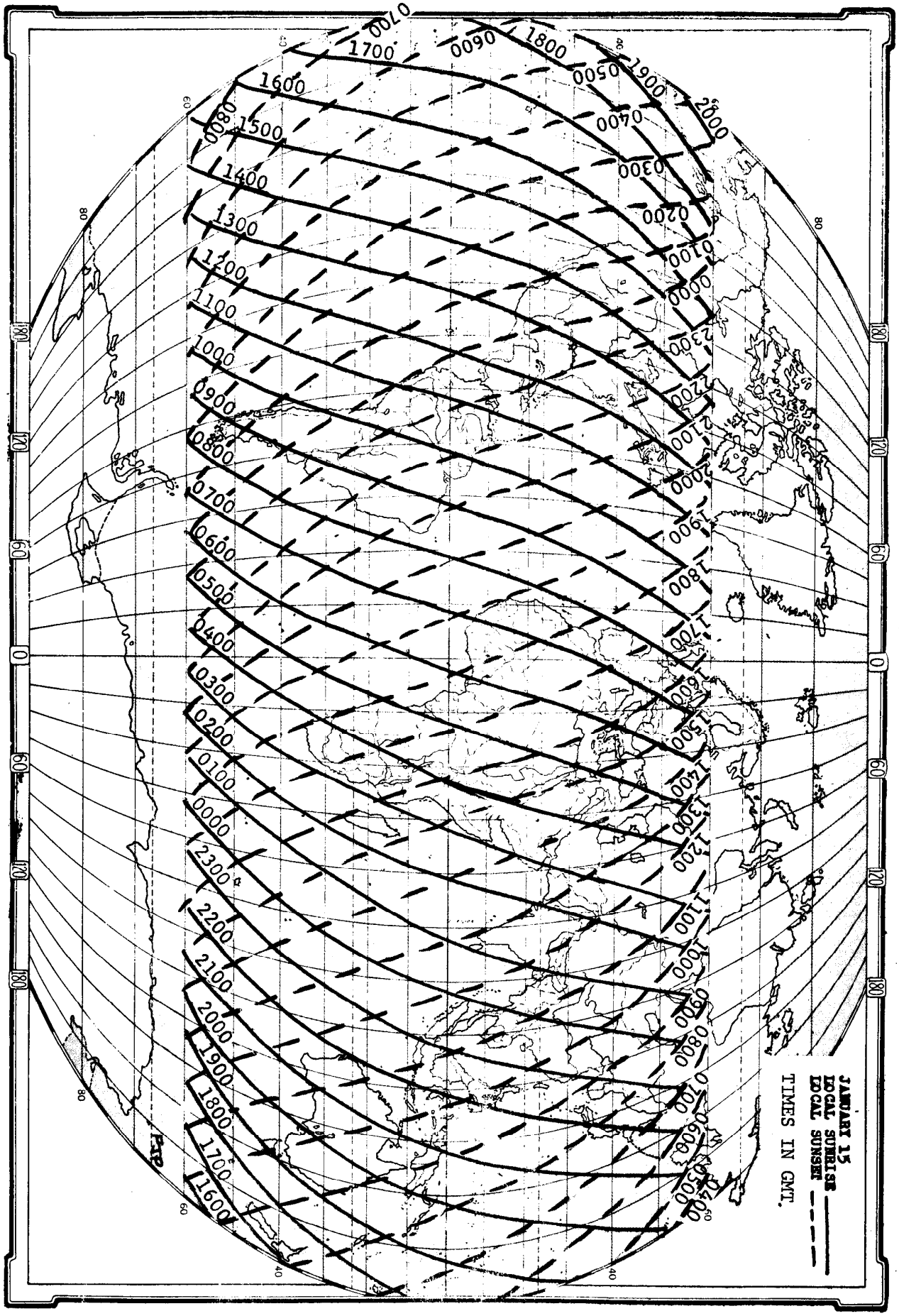
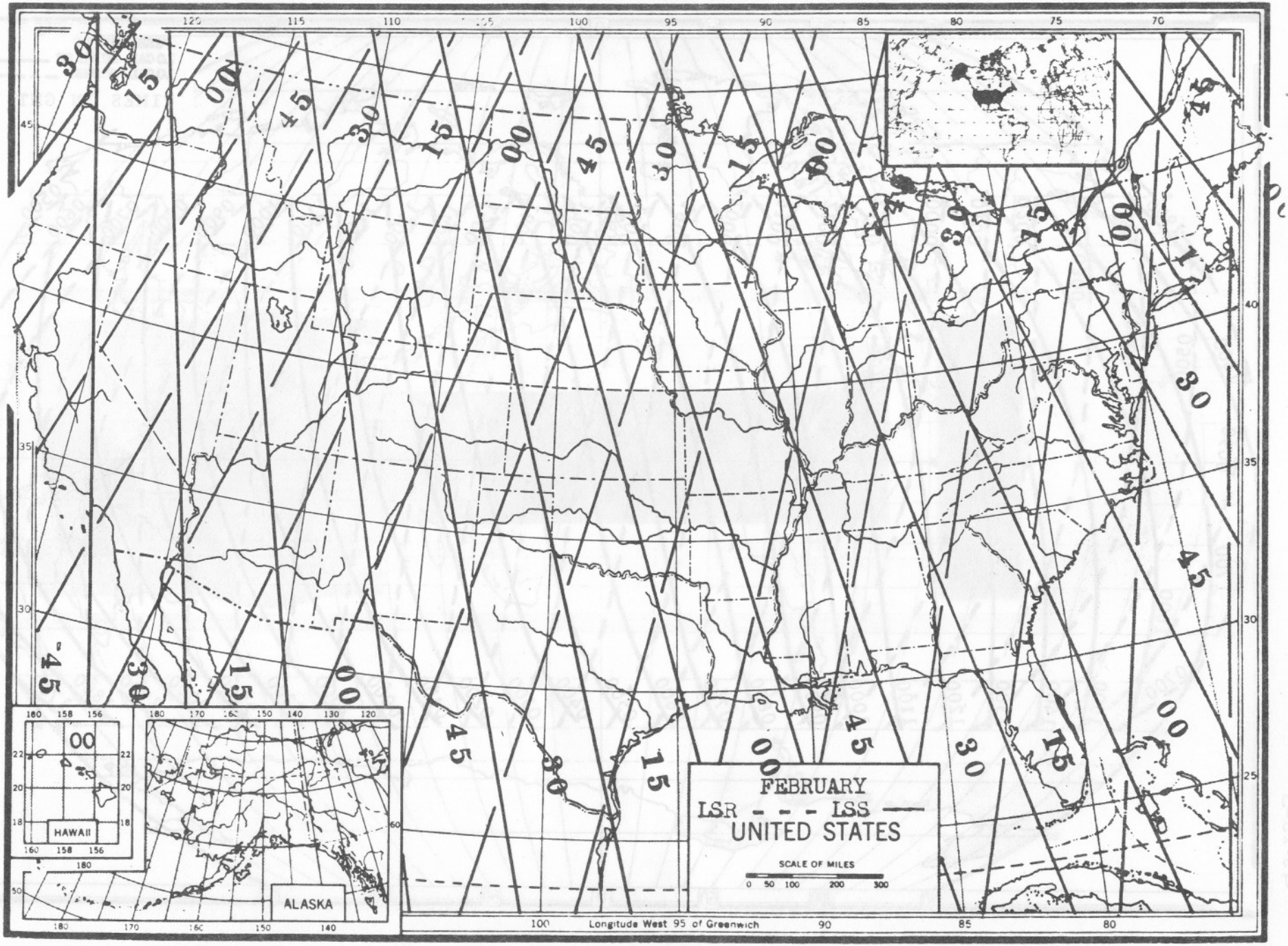
ALASKA
HAWAII

93-25-3

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LSR - - - LSS —
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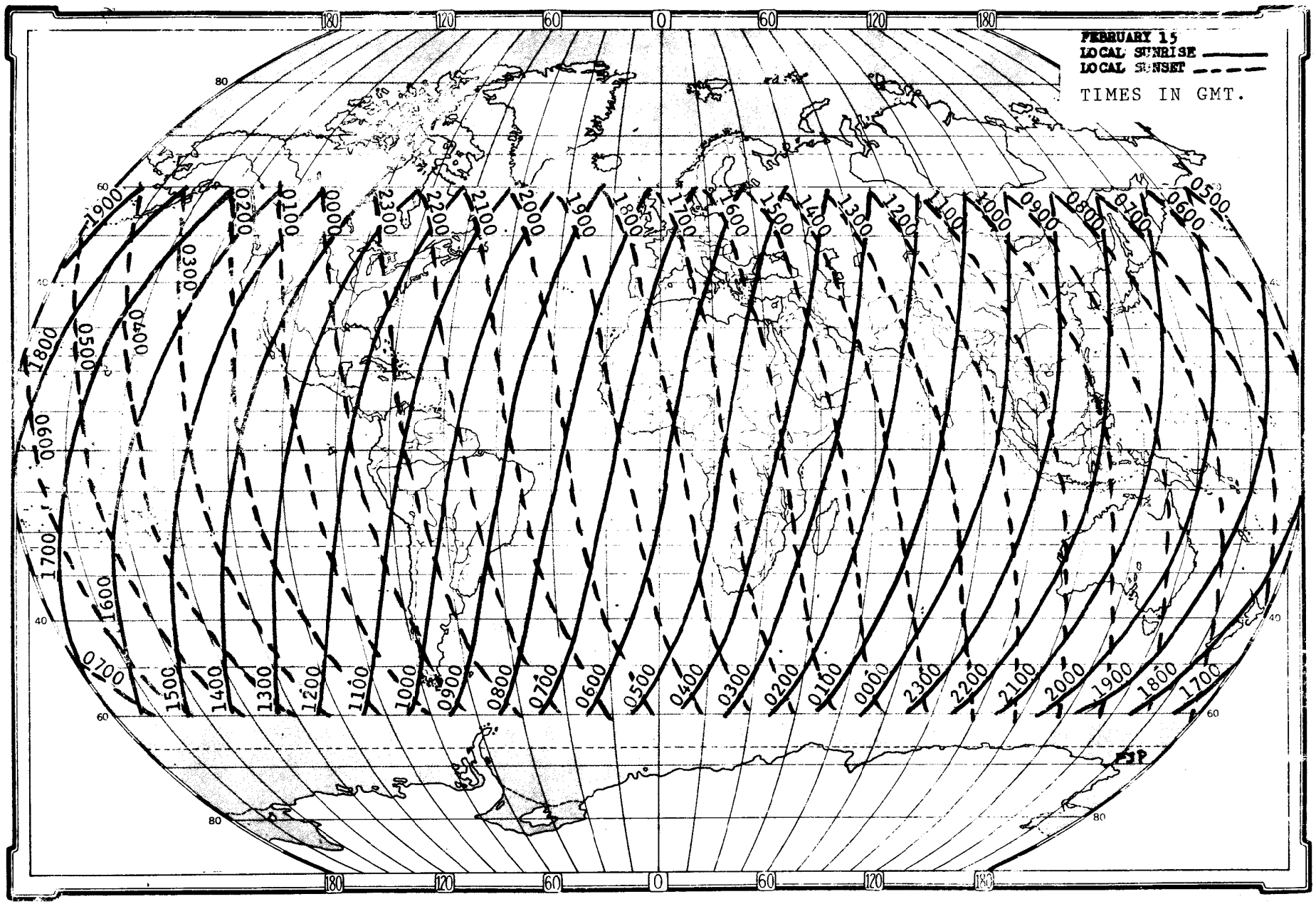
HAWAII
ALASKA
Longitude West 95 of Greenwich


FEBRUARY 15
LOCAL SUNRISE
LOCAL SUNSET
TIMES IN GMT.
180
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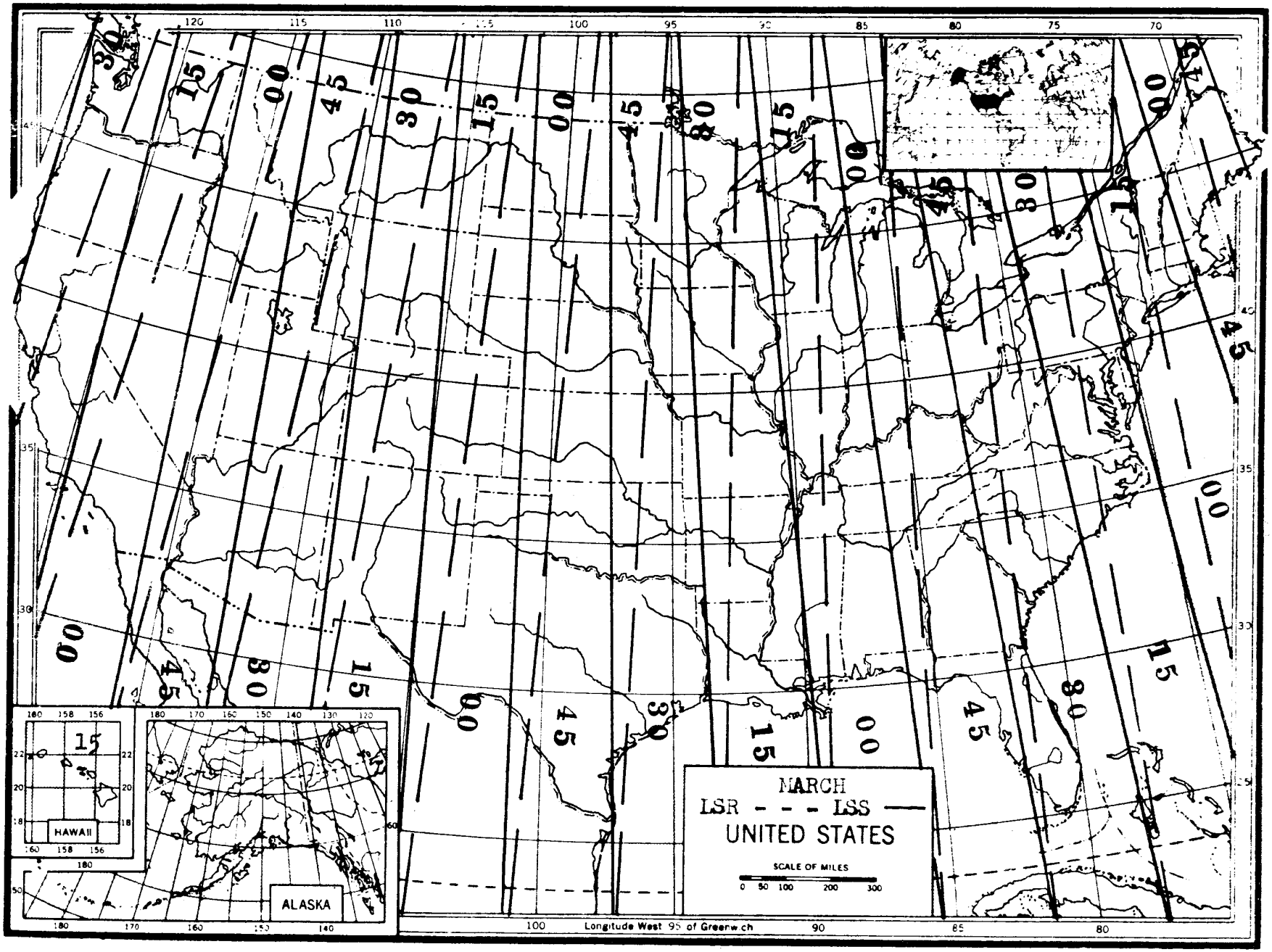
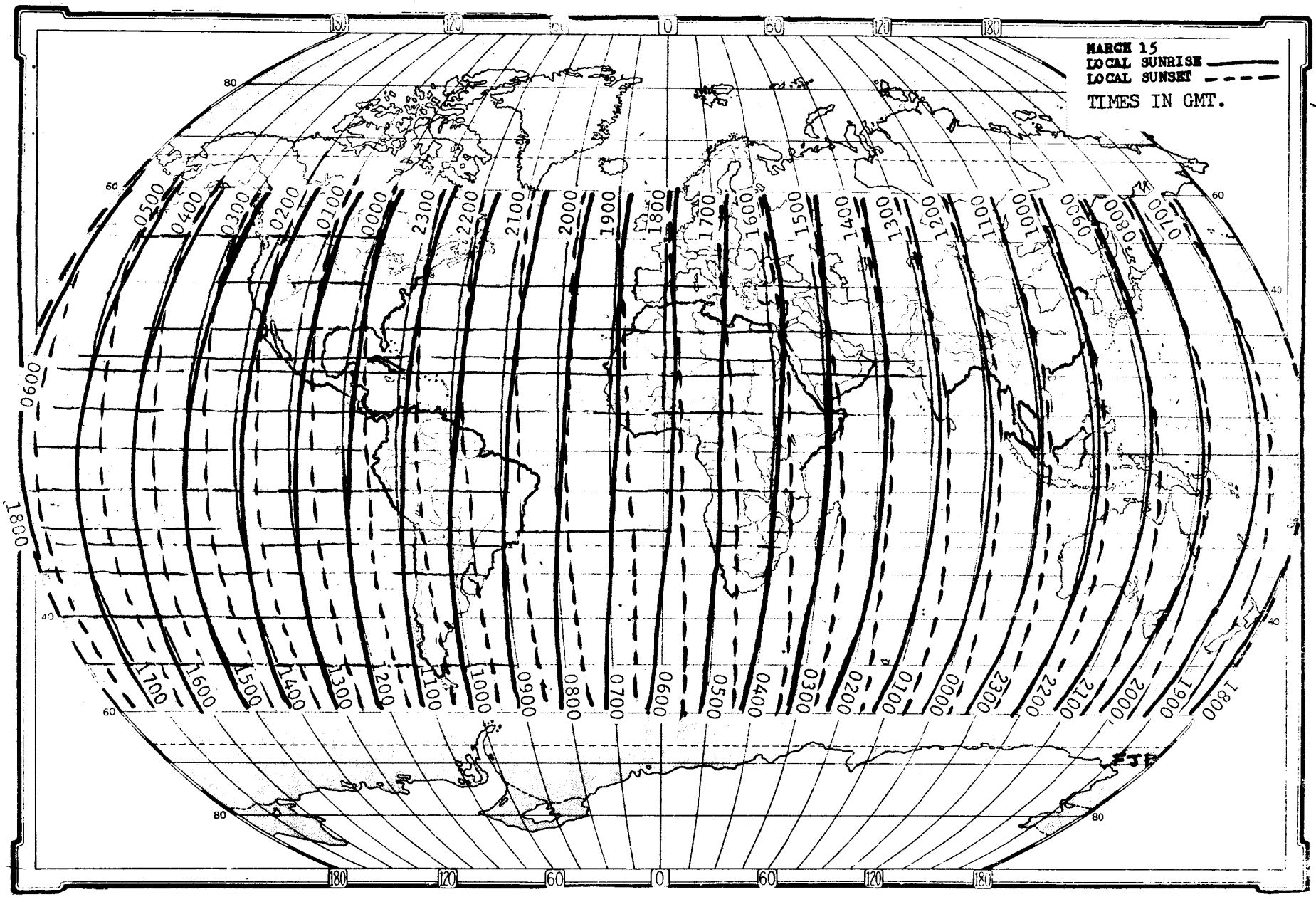
1700
SP

G3-25-5


MARCH
LSR - - - LSS
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

43-25-6


MARCH 15
LOCAL SUNRISE
LOCAL SUNSET
TIMES IN GMT.
180
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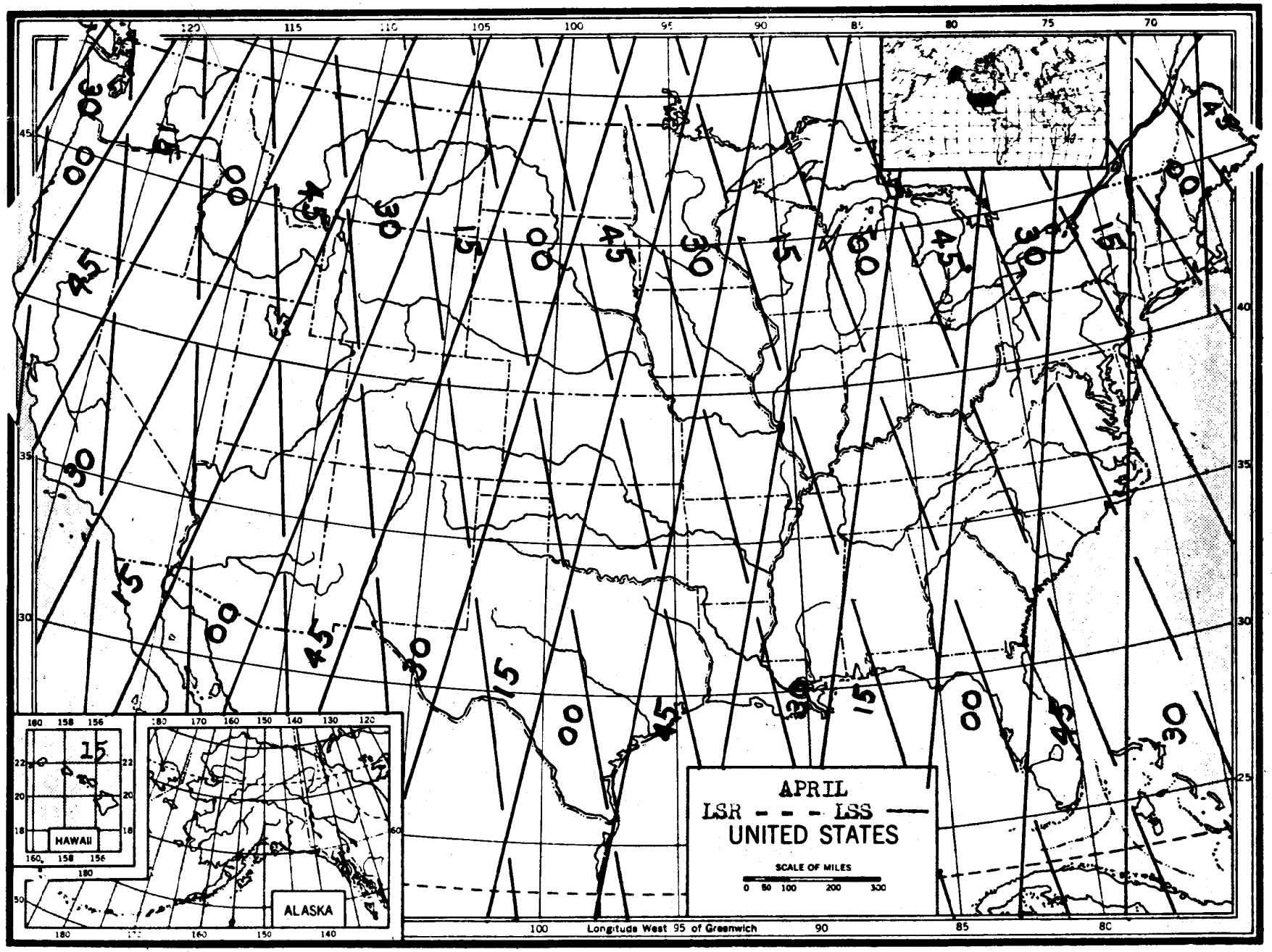
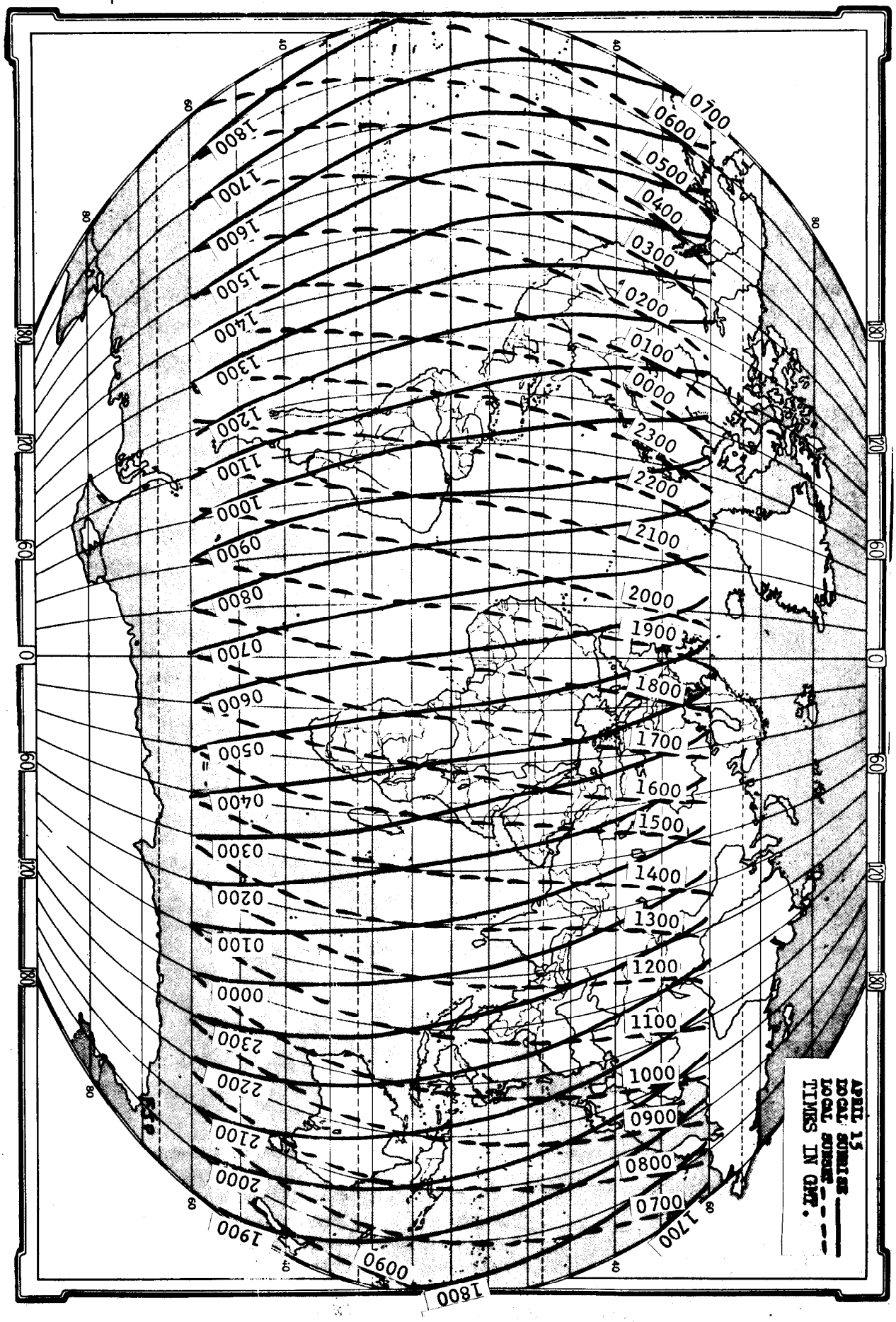
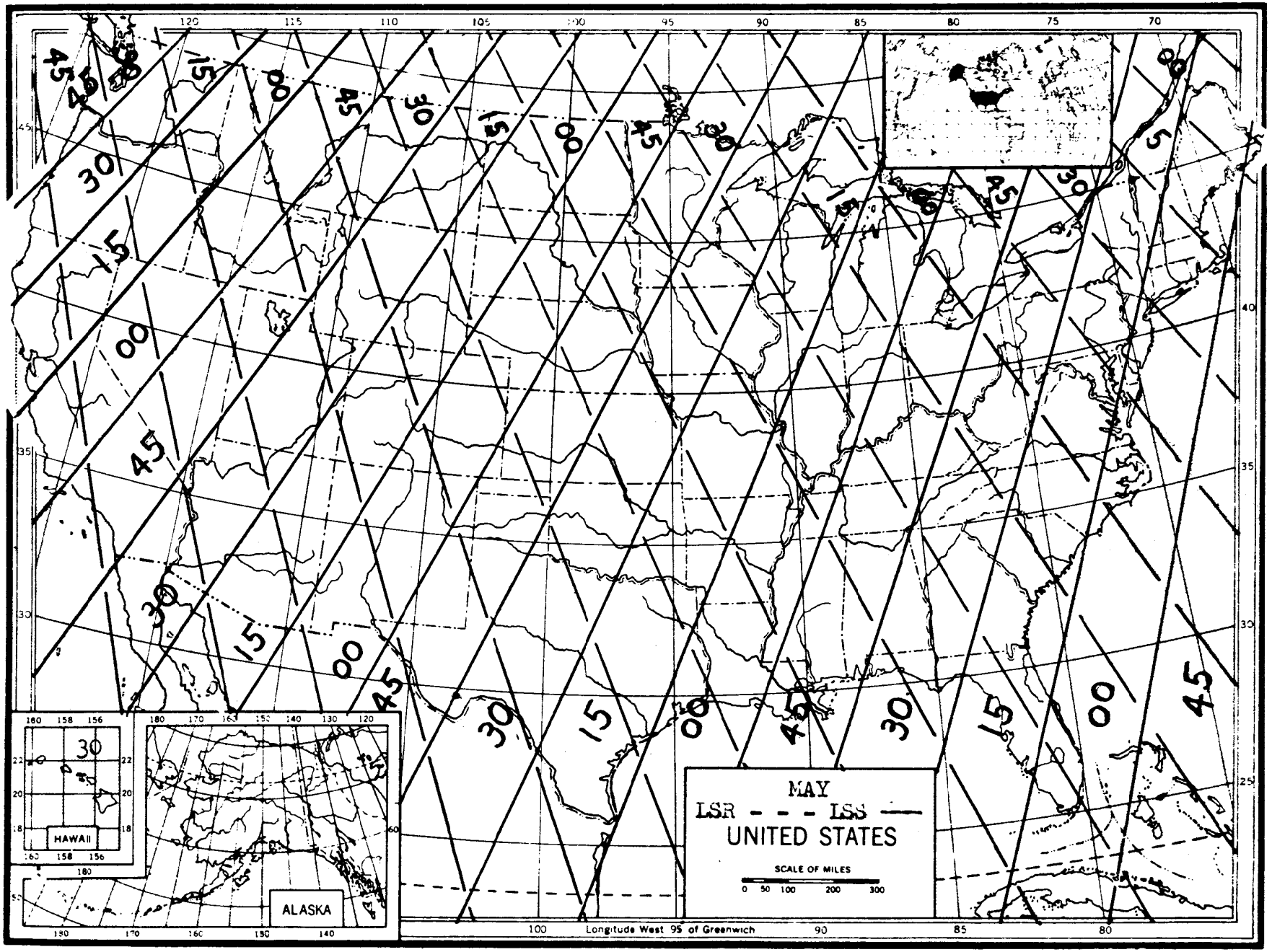
1800


APRIL
LSR - - - LSS —
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

43-25-8

93-25-9




MAY
LSR - - - LSS —
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

43-25-10

MAY 15
LOCAL SUNRISE
LOCAL SUNSET
TIMES IN GMT.
180
120
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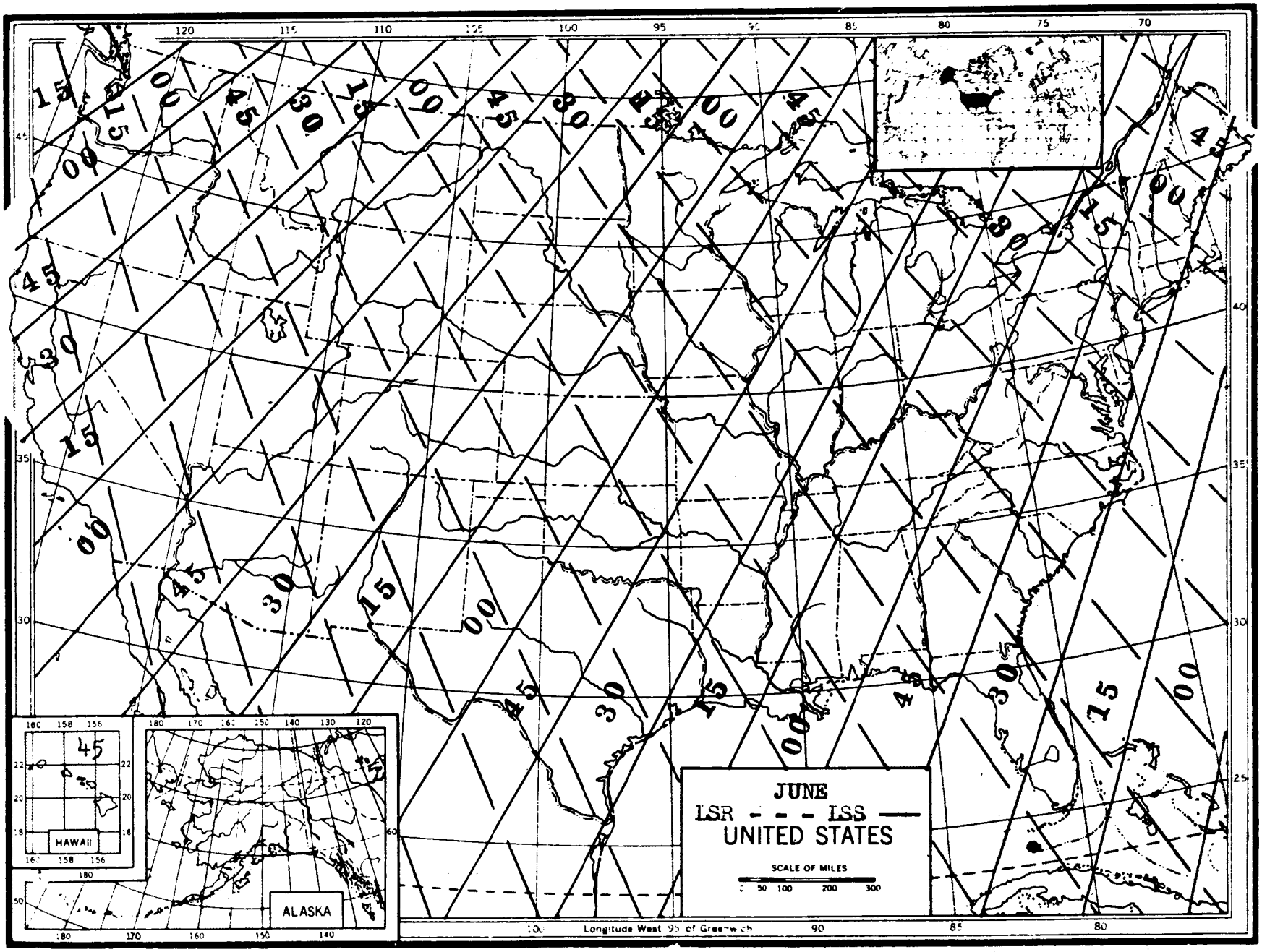
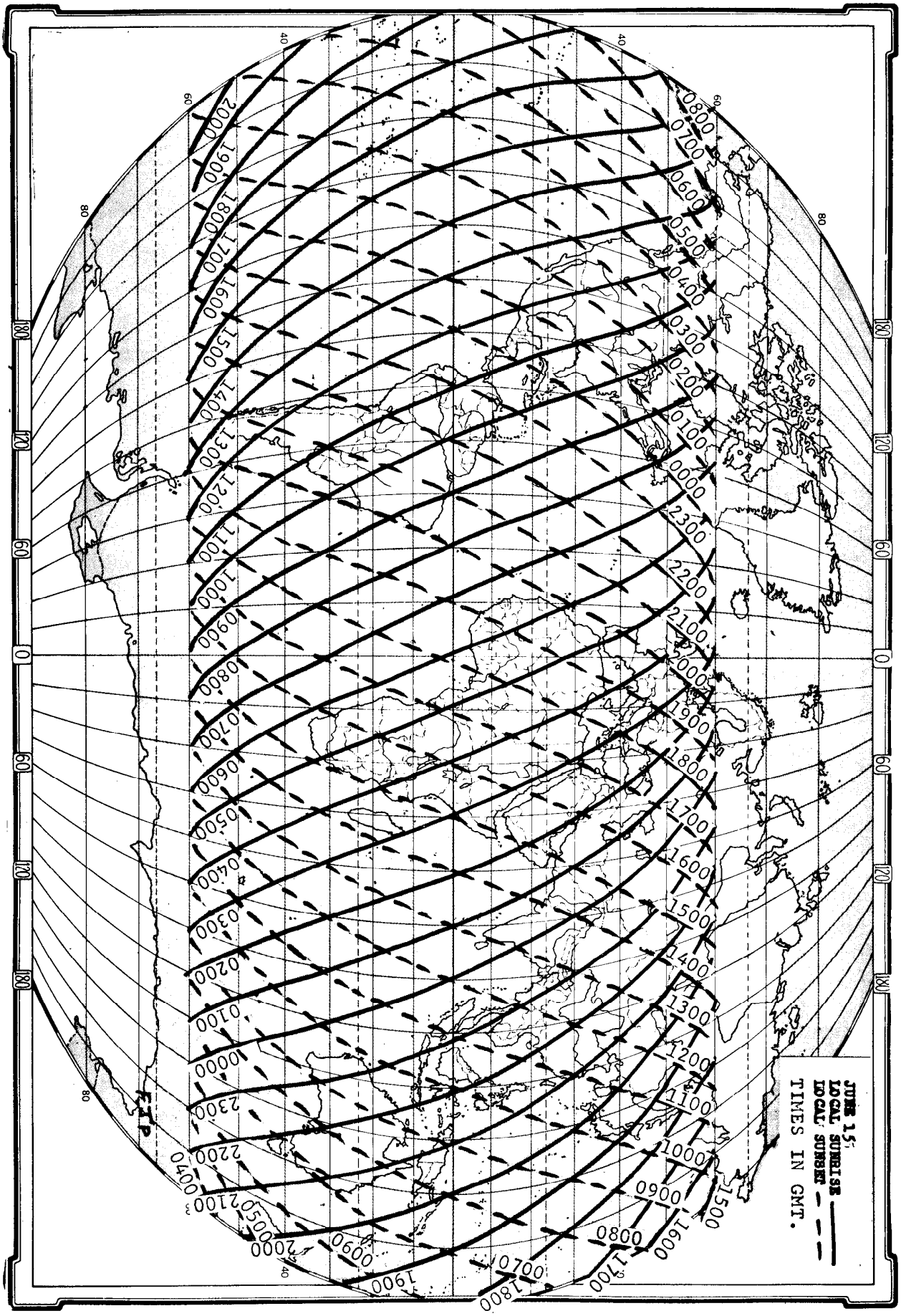
FTP

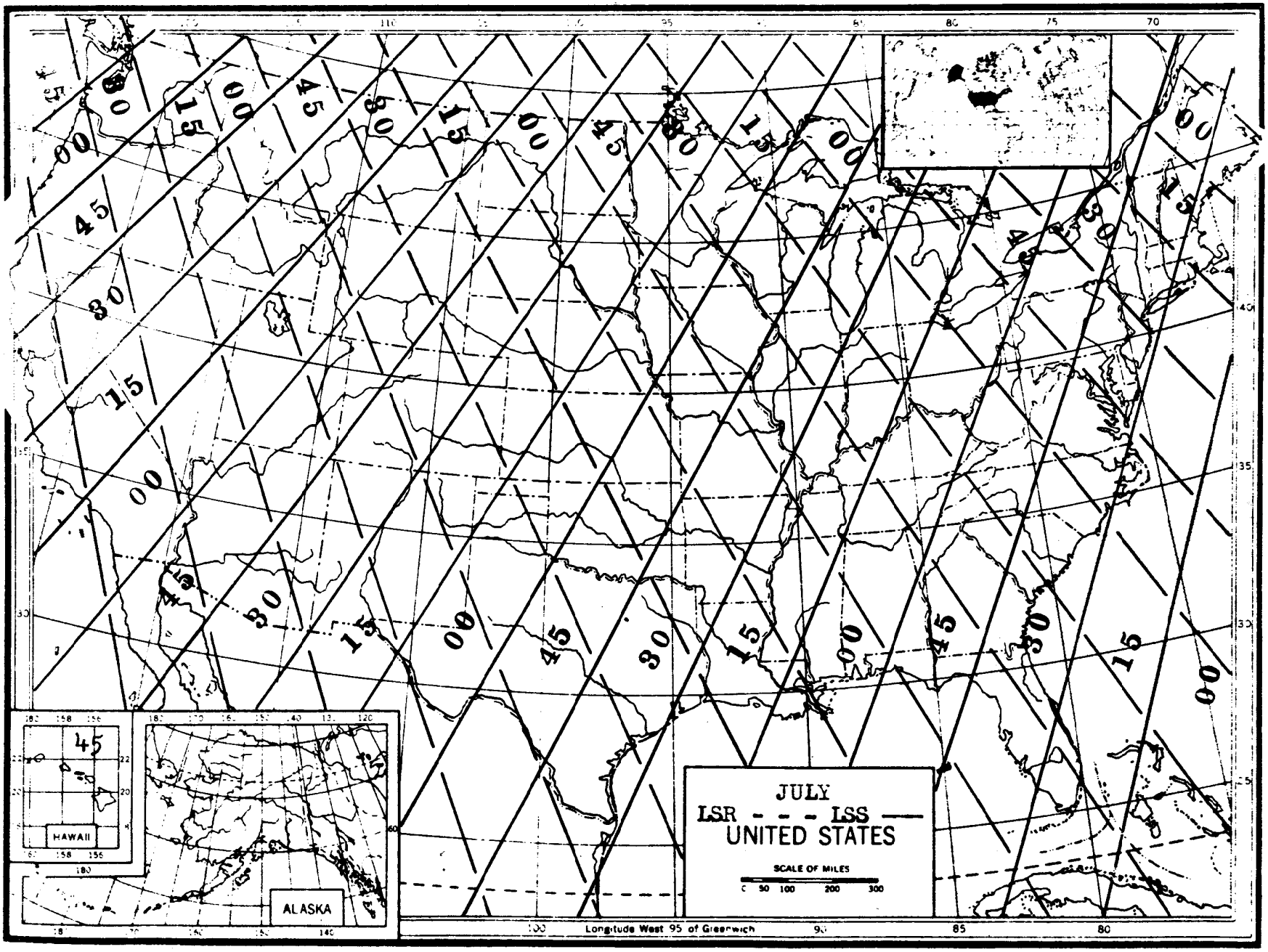
93-25-11


JUNE
LSR - - - LSS
UNITED STATES
SCALE OF MILES
50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

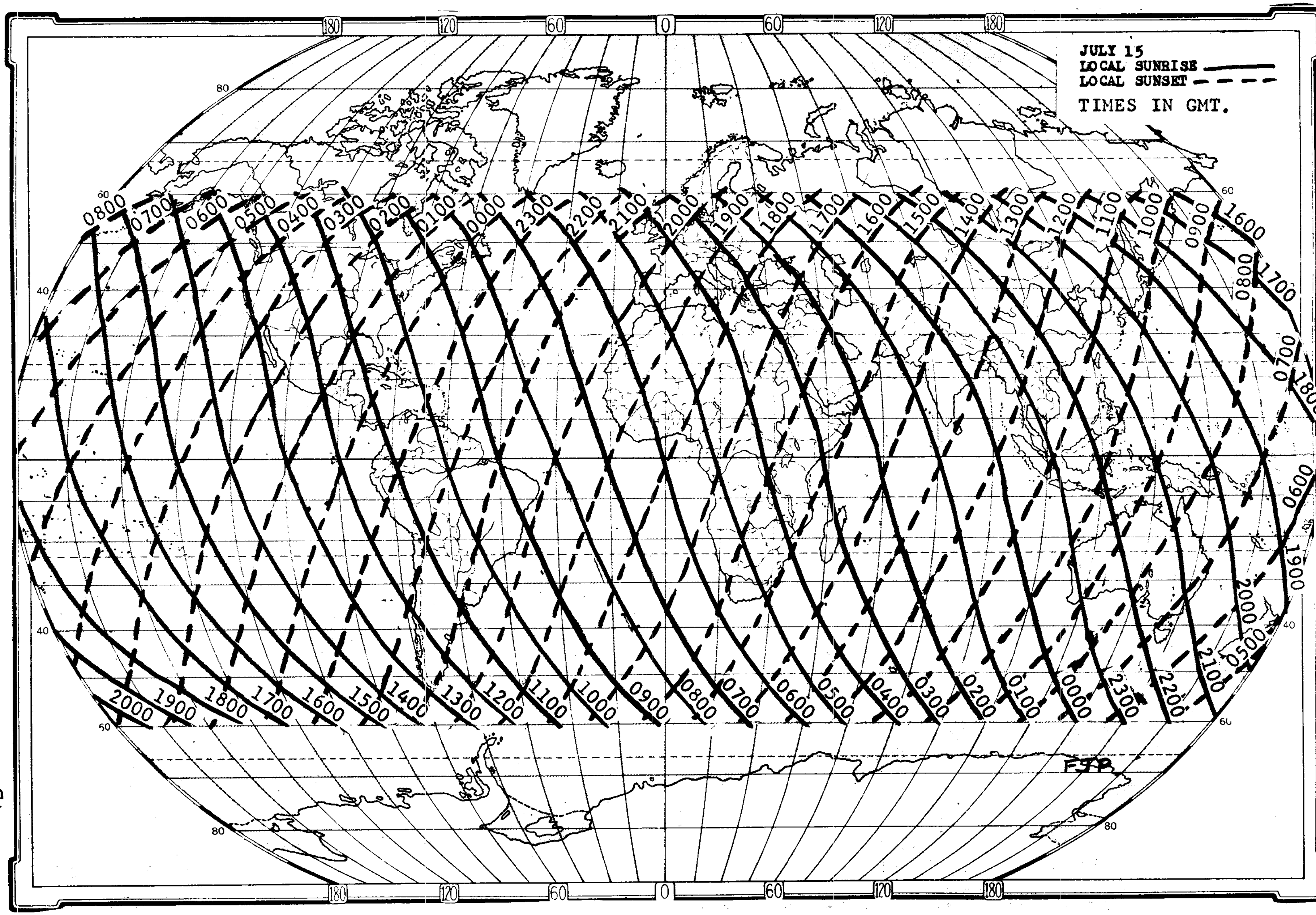
43-15-12

93-25-13




JULY
LSR - - - LSS
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

G3-25-14



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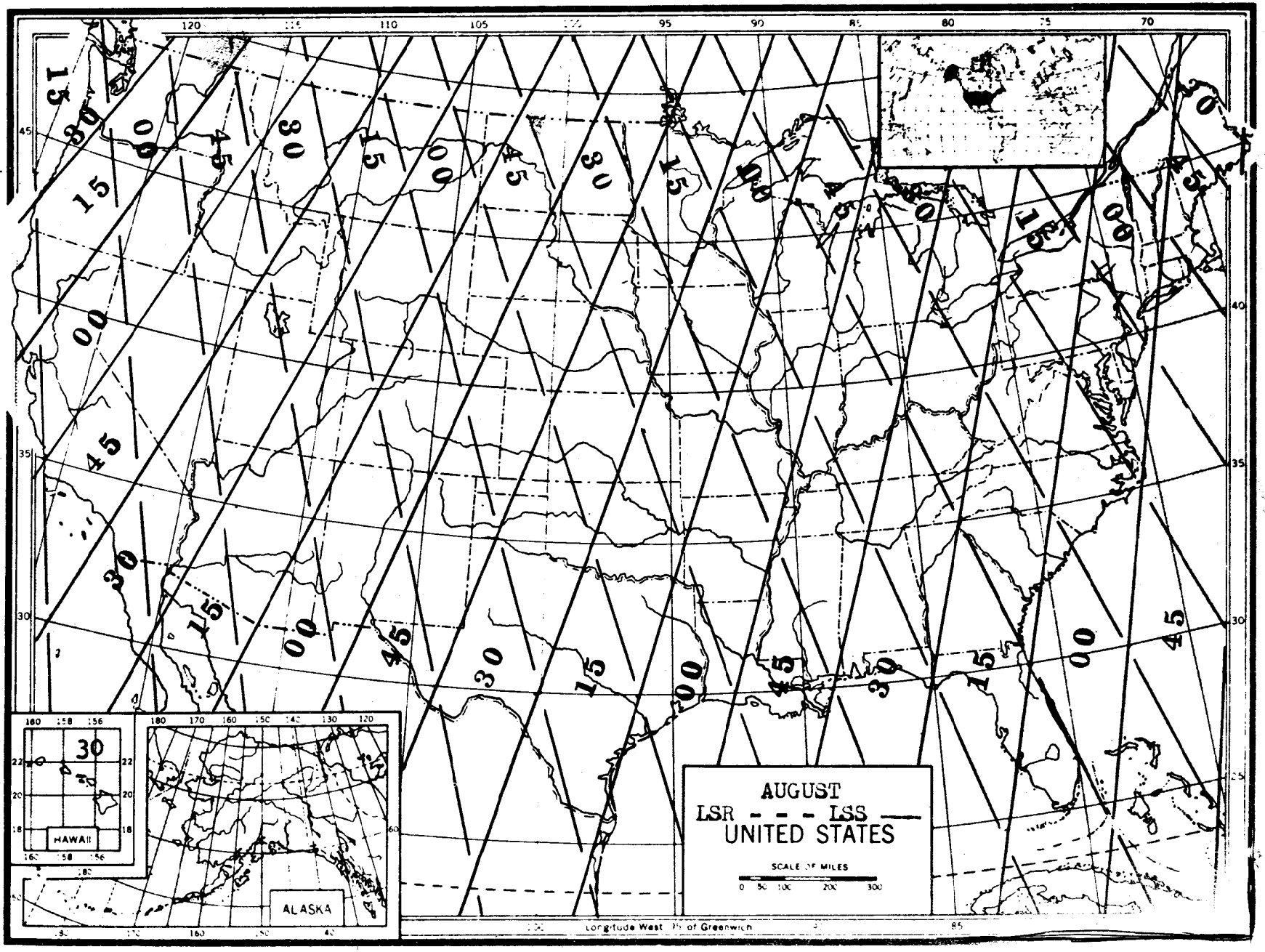
AUGUST
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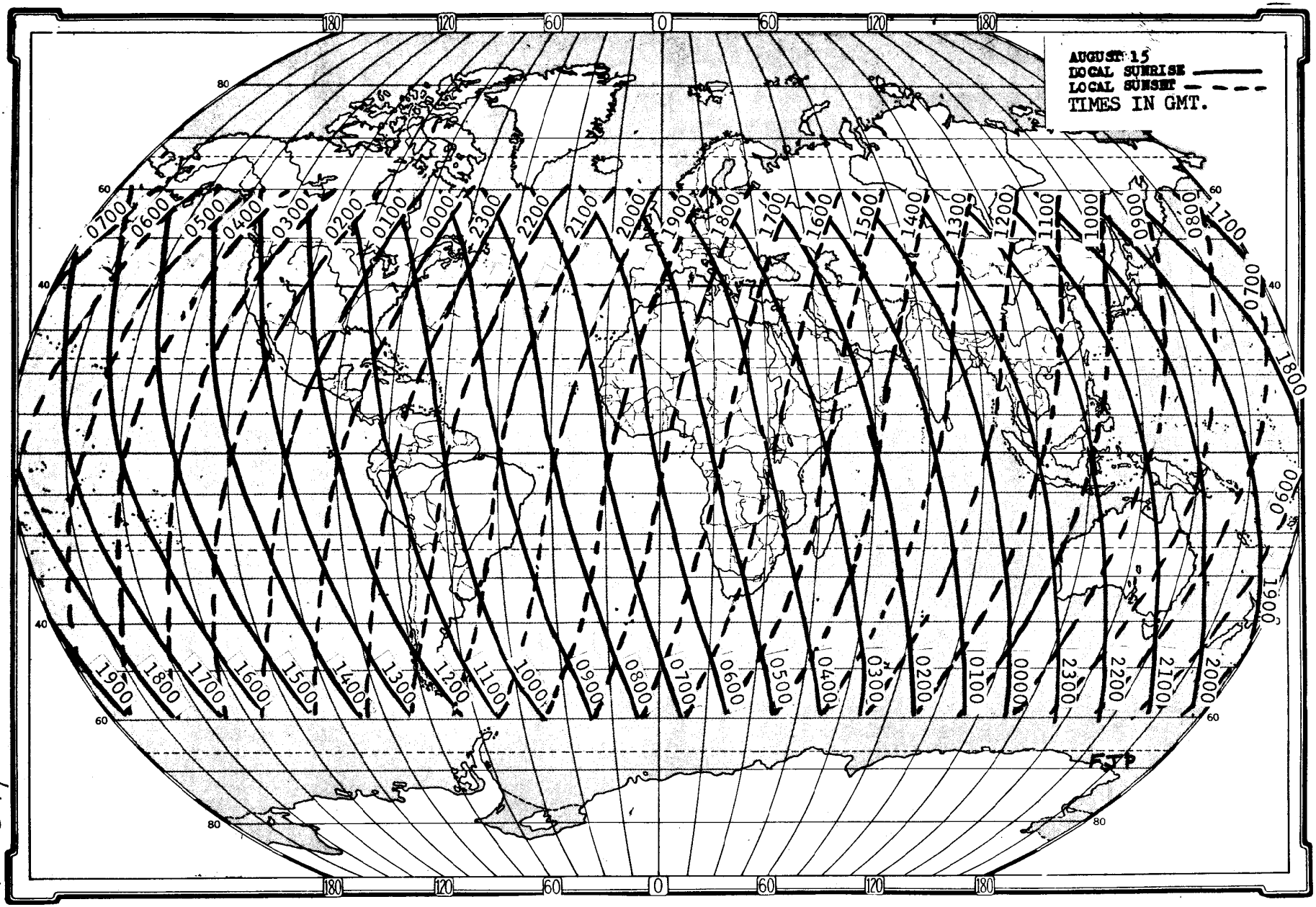
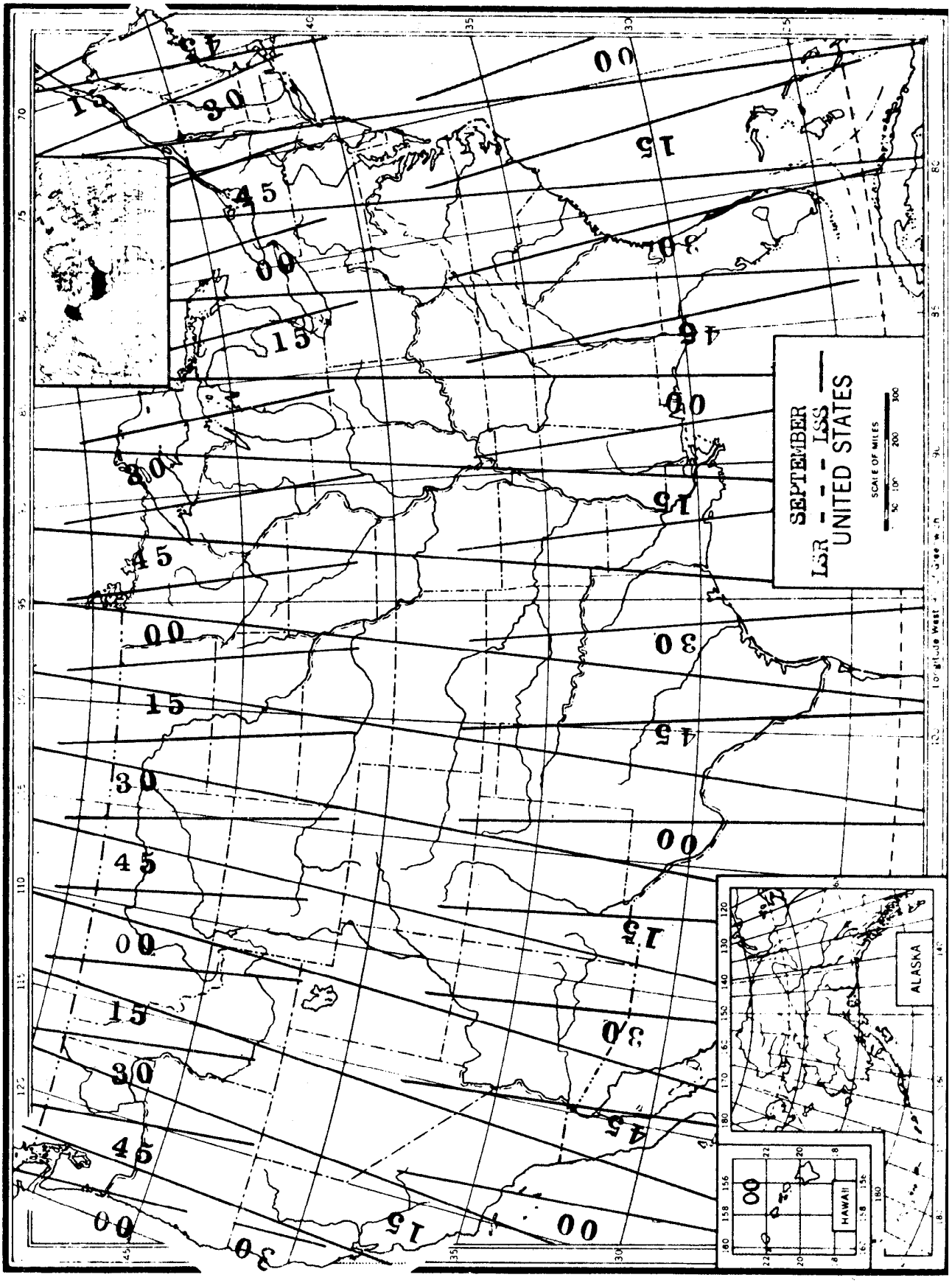
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West of Greenwich

G3-25-16

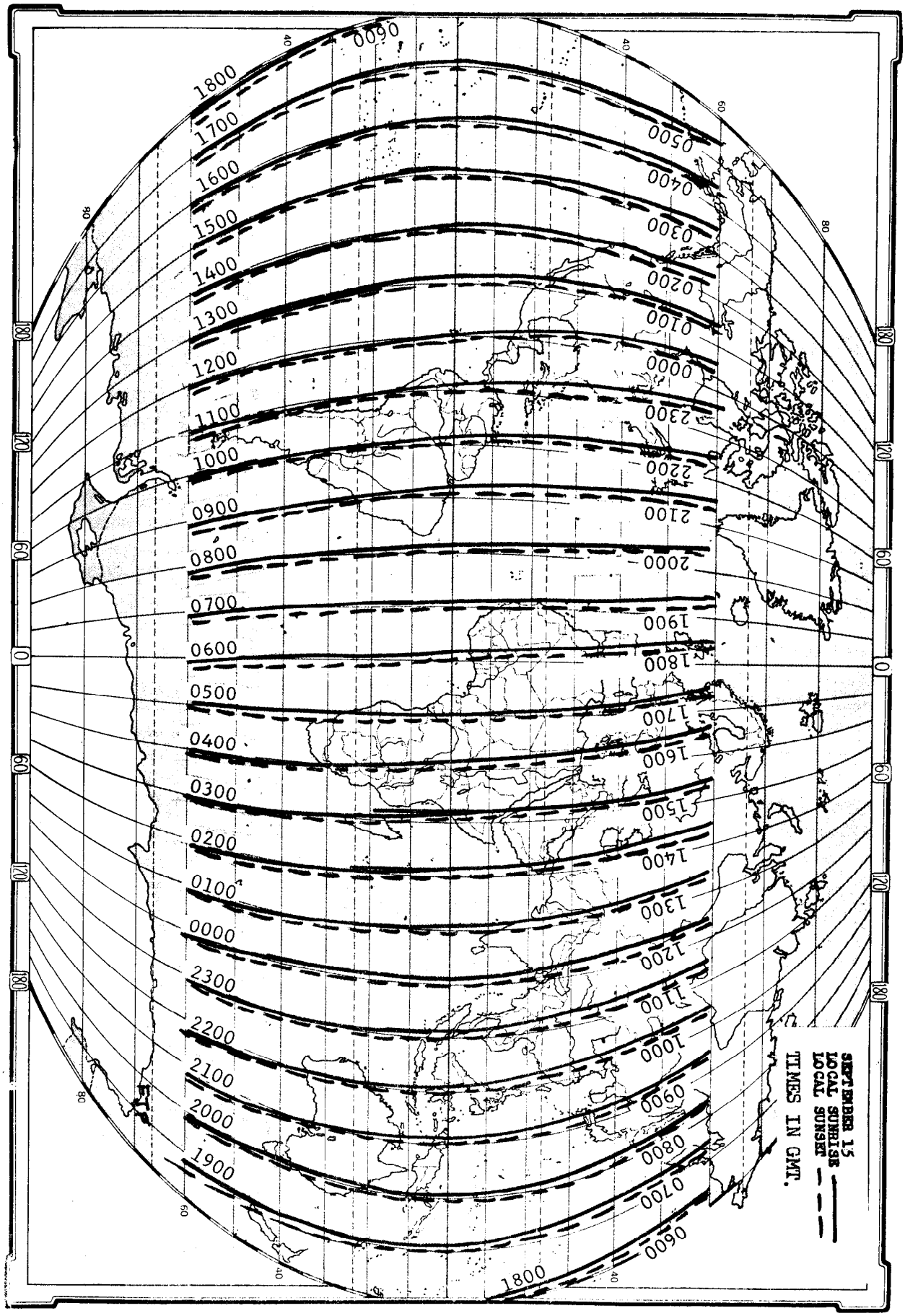


43-25-17

93-25-18


SEPTEMBER
LSR - - - LSS
UNITED STATES
SCALE OF MILES
ALASKA
HAWAII

93-25-19



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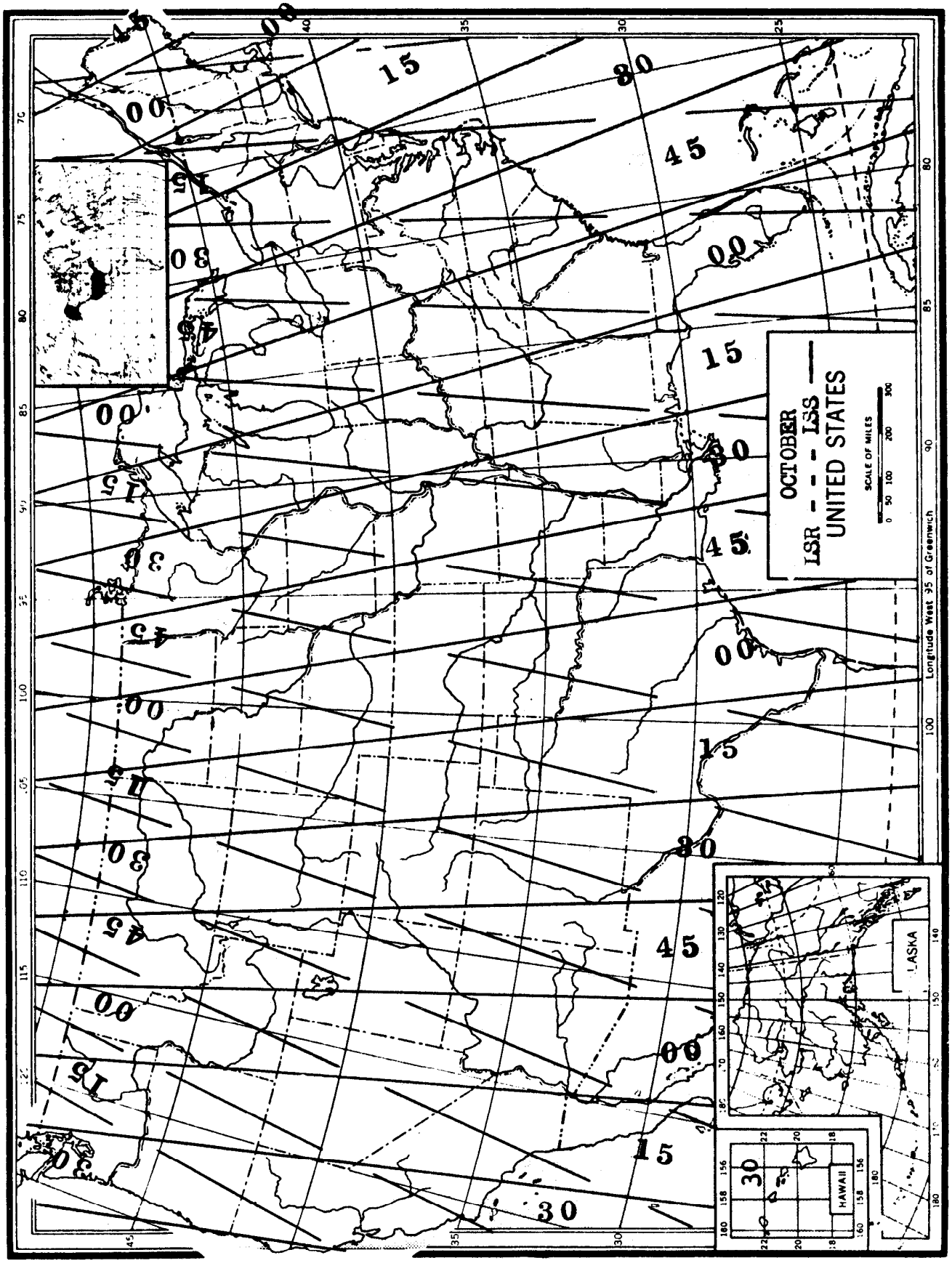
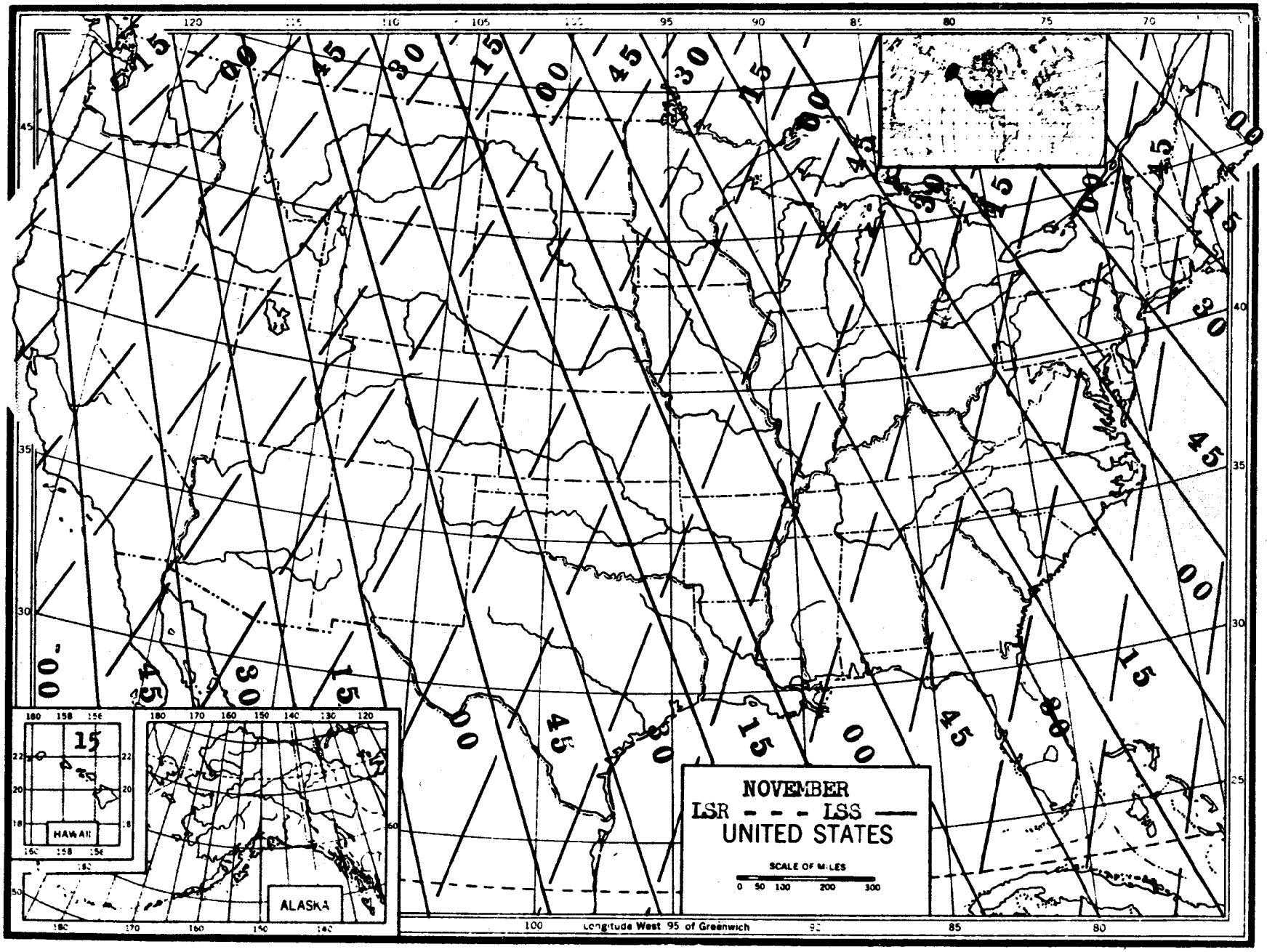
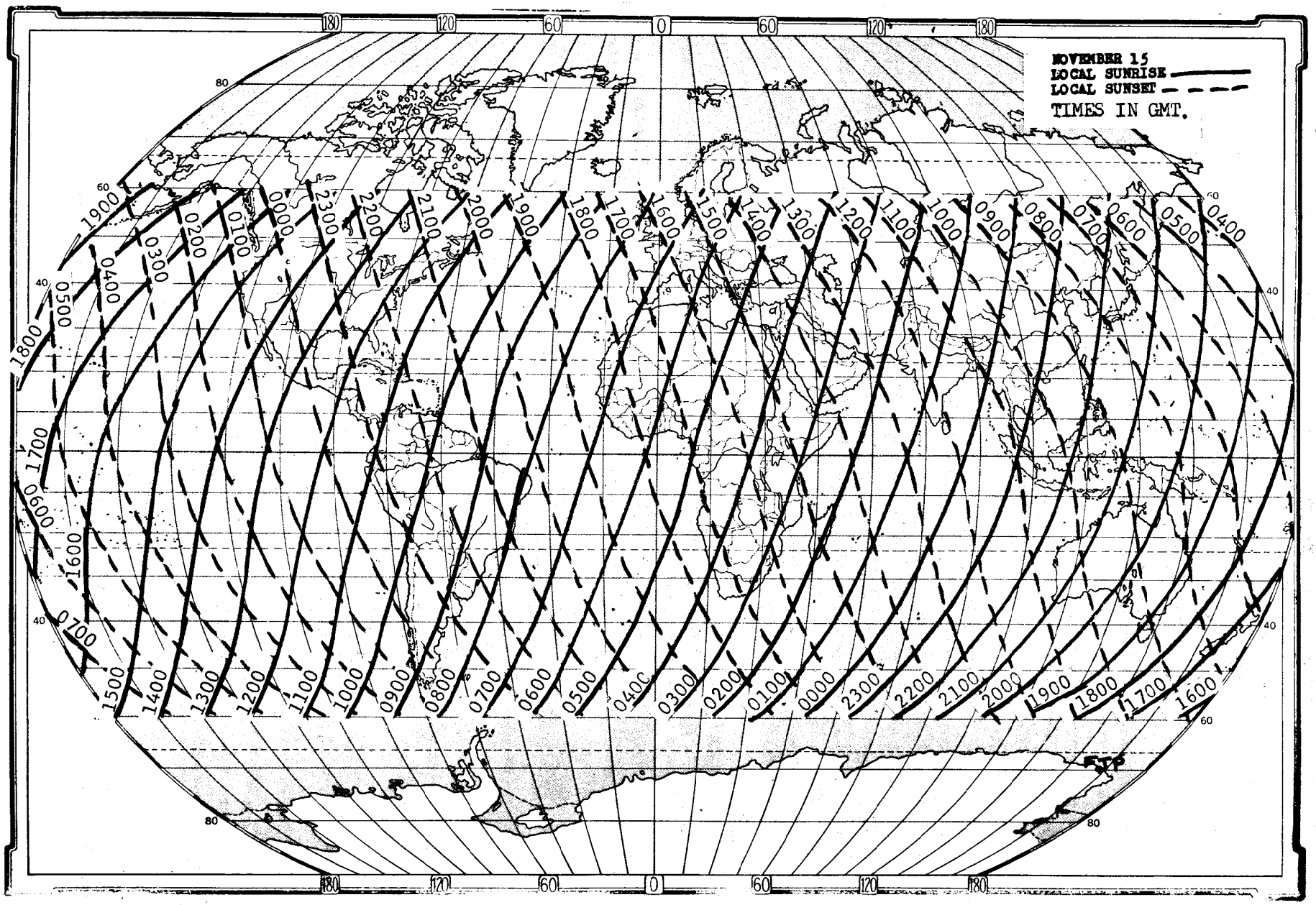

OCTOBER
LSR ---- LSS ——
UNITED STATES
SCALE OF MILES
0 50 100 200 300
Longitude West 95 of Greenwich
ALASKA
HAWAII

G3-25-21


NOVEMBER
LSR - - - LSS —
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

43-25-12


NOVEMBER 15
LOCAL SUNRISE
LOCAL SUNSET
TIMES IN GMT.
180
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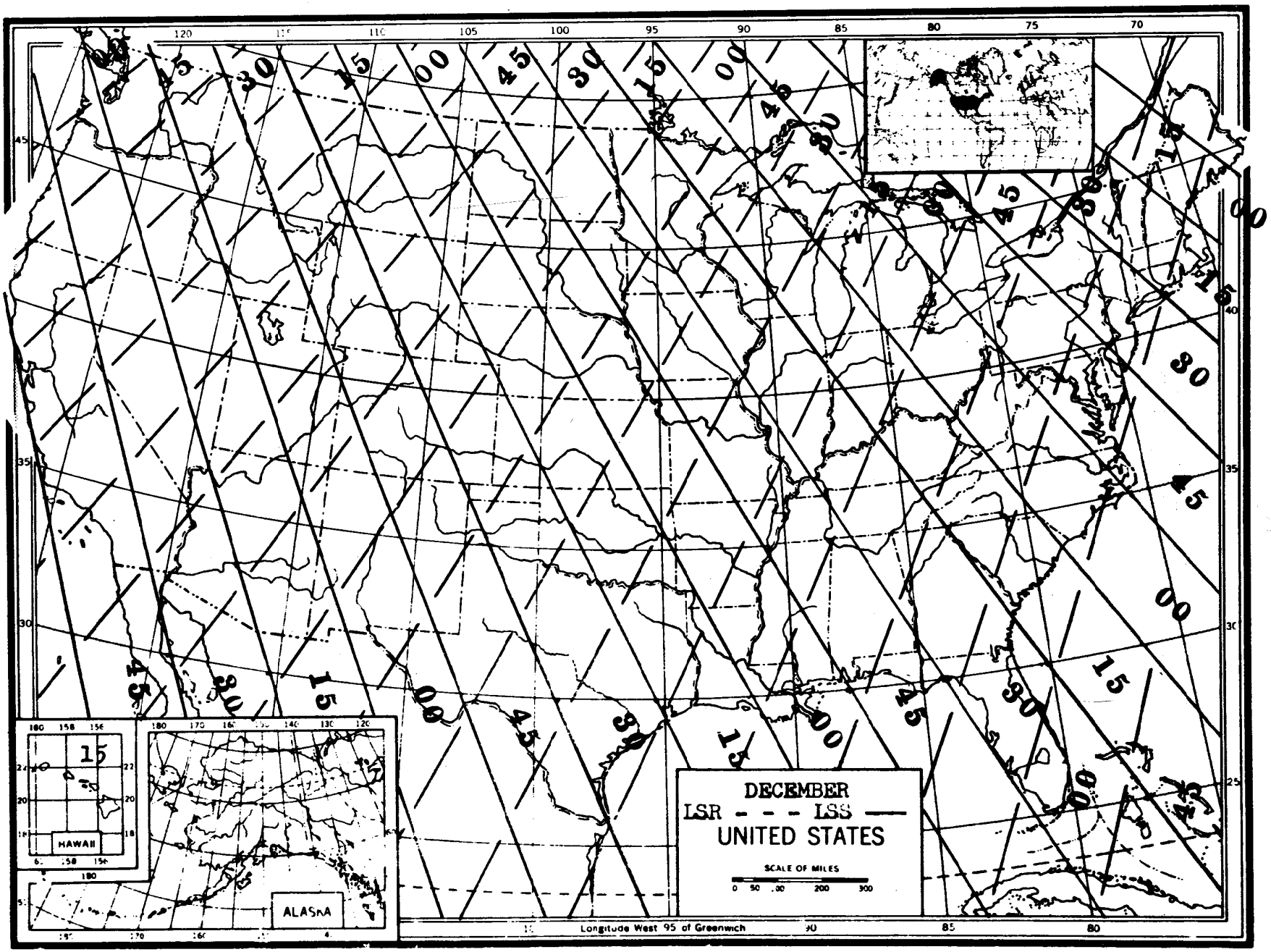
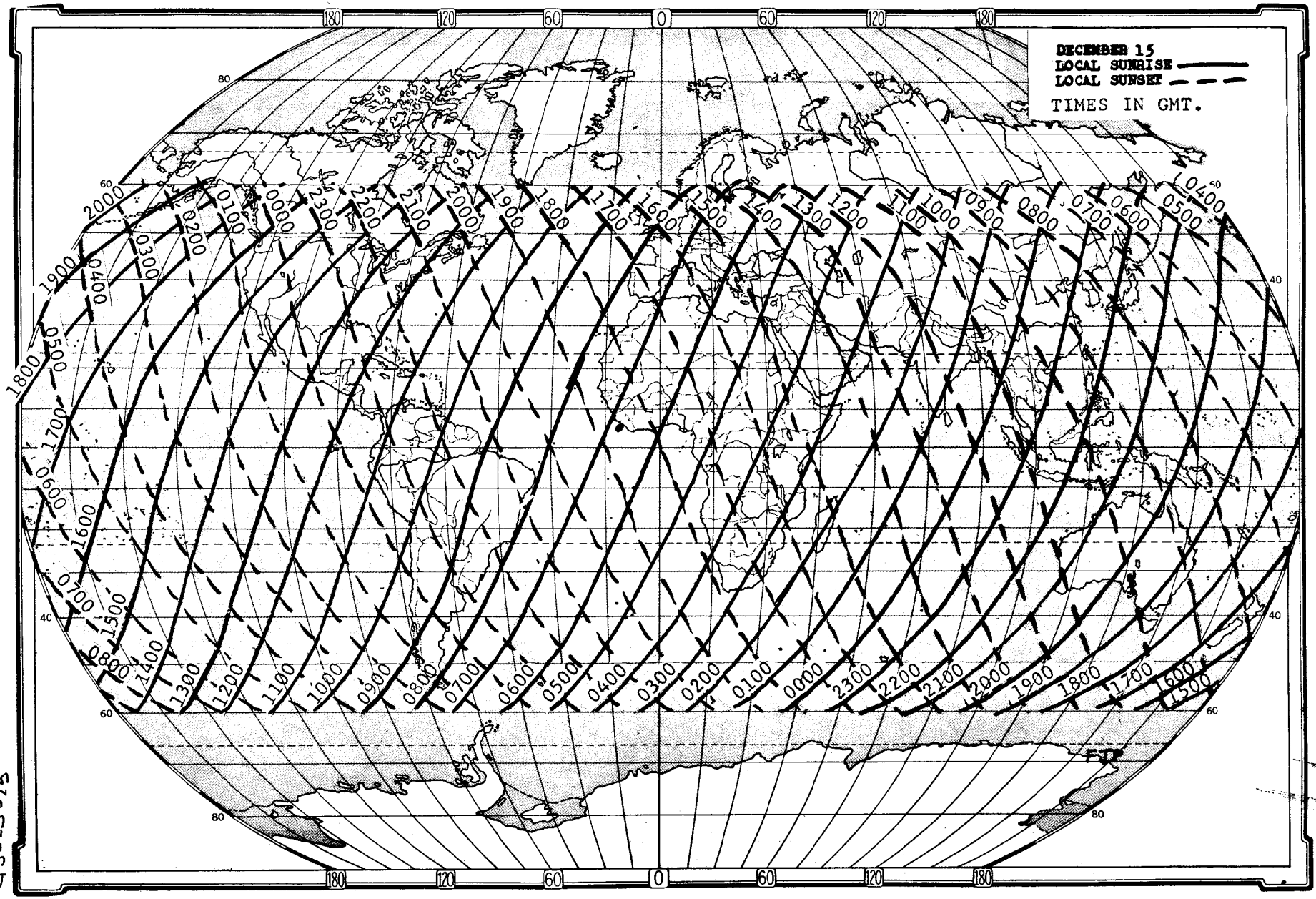
C3-15-23


DECEMBER
LSR - - - LSS —
UNITED STATES
SCALE OF MILES
0 50 100 200 300
HAWAII
ALASKA
Longitude West 95 of Greenwich

43-25-24


DECEMBER 15
LOCAL SUNRISE
LOCAL SUNSET
TIMES IN GMT.
180
120
60
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60
120
180
80
60
40
40
60
80
FTP

G3-25-15