



WEATHER BUREAU
Western Region
Salt Lake City, Utah
January 1970

EXTA

Precipitation Probabilities in the Western Region Associated With Fall 500-mb. Map Types

Richard P. Augulis

REC. SLC
ROUTING SLIP

	Action	Info.	Init.
Zimmerman			
McDonough			
Westledge			
Williams			
Ellsworth			
File			



Technical Memorandum WBTM WR-45-4

U.S. DEPARTMENT OF COMMERCE / ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

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ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
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Weather Bureau Technical Memorandum WR-45/4

PRECIPITATION PROBABILITIES IN THE WESTERN REGION
ASSOCIATED WITH FALL 500-MB MAP TYPES

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WESTERN REGION
TECHNICAL MEMORANDUM NO. 45/4

SALT LAKE CITY, UTAH
JANUARY 1970

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PRECIPITATION PROBABILITIES IN THE WESTERN REGION
ASSOCIATED WITH FALL 500-MB MAP TYPES

I. INTRODUCTION

Precipitation probabilities associated with fall 500-mb map types were generated employing the same typing technique presented in WBTM WR 45/1 "Precipitation Probabilities in the Western Region Associated with Winter 500-mb Map Types".

The fall season consisted of 1170 maps for 0000 and 1200GMT September 1962-1968, October 1962-1968, and November 1961-1967. Climatologies for 12-hour precipitation were calculated for the same station network in the Western Region.

Maps of fall type climatologies along with associated type and pure mean map are given in Appendix A. The type maps have been arranged according to basic similarities in the large-scale flow over the typing area. The divisions are as follows:

Trough 130 - 150°W.--types 2, 5, 11, 14, 18, 23

Trough 120 - 125°W.--types 3, 16, 17, 20

Trough 110 - 115°W.--types 6, 7, 10, 13, 22, 25

Zonal flow--types 1, 9

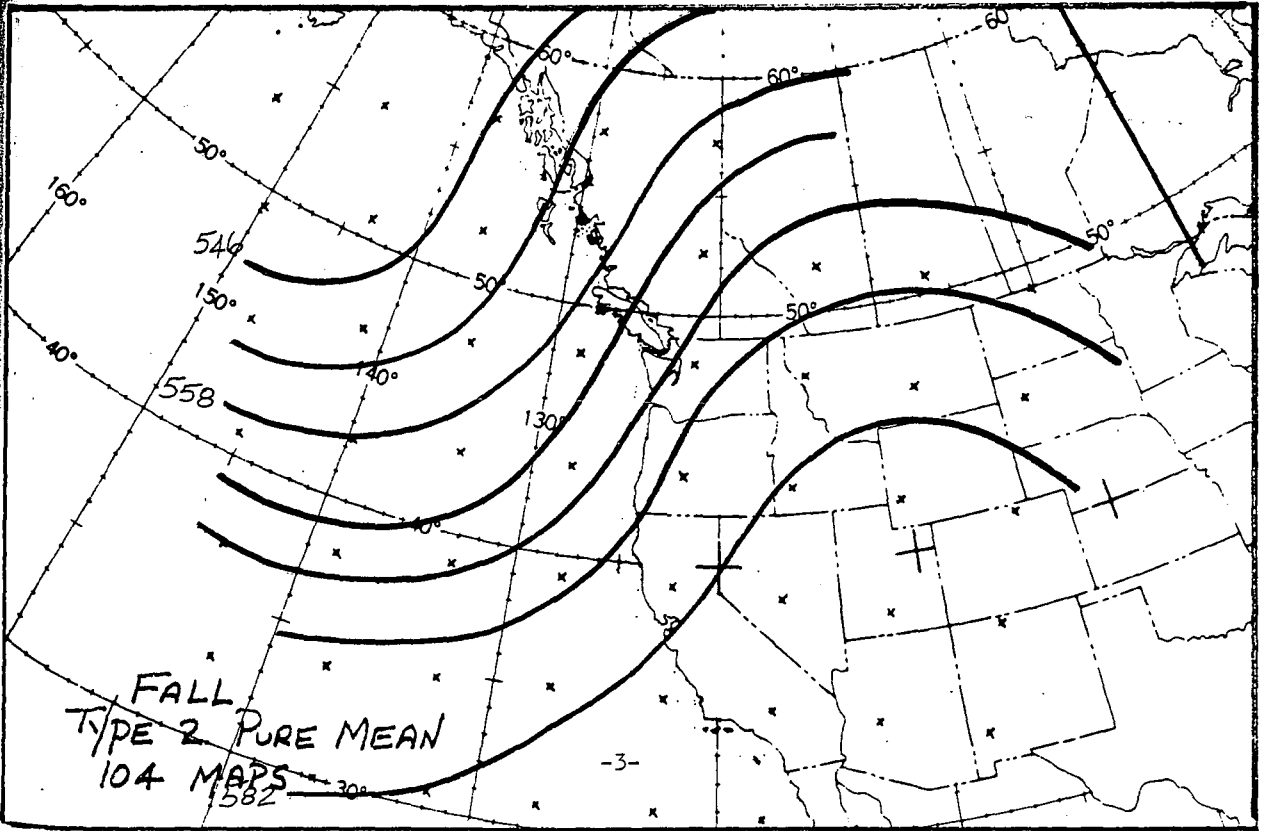
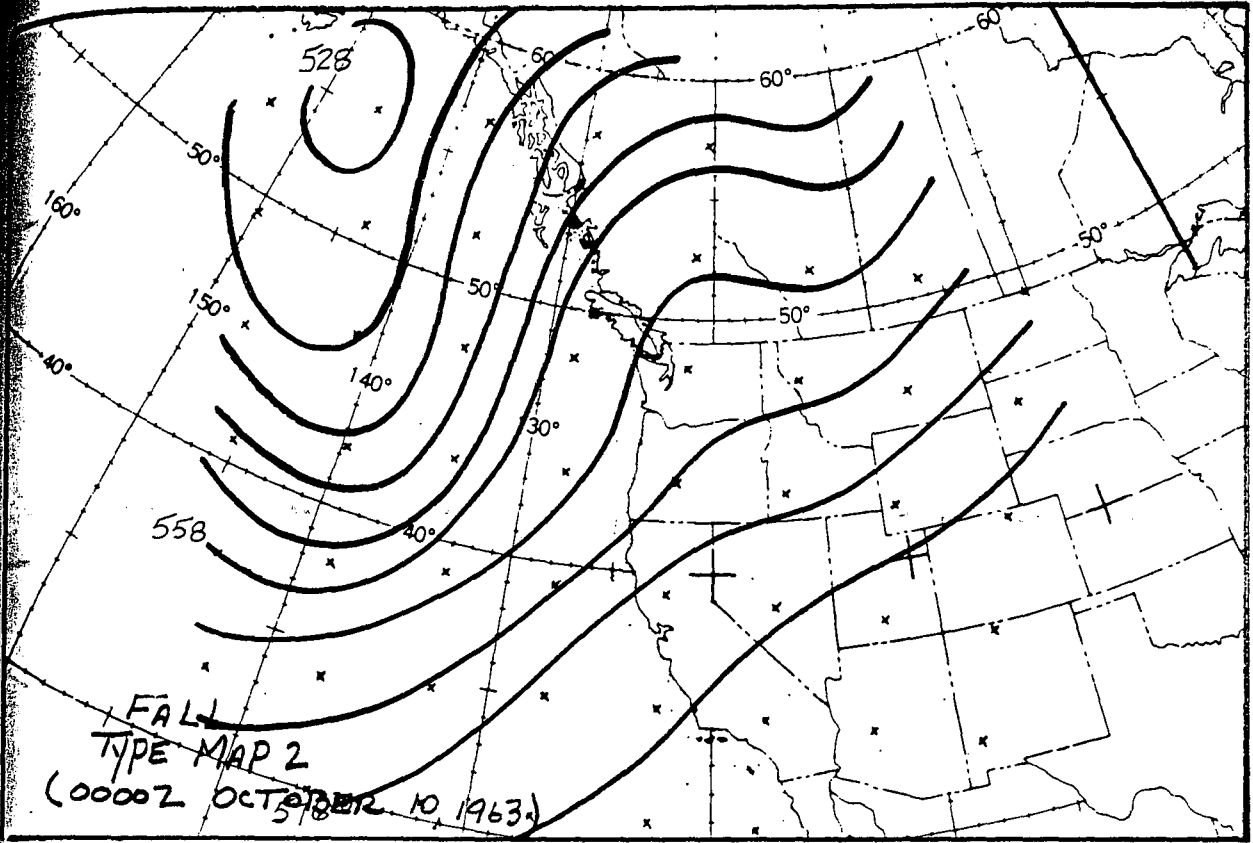
Ridge 120 -140°W.--types 4, 8, 12, 15, 19, 21, 24.

A listing of dates of occurrence of each fall type is given in Appendix B.

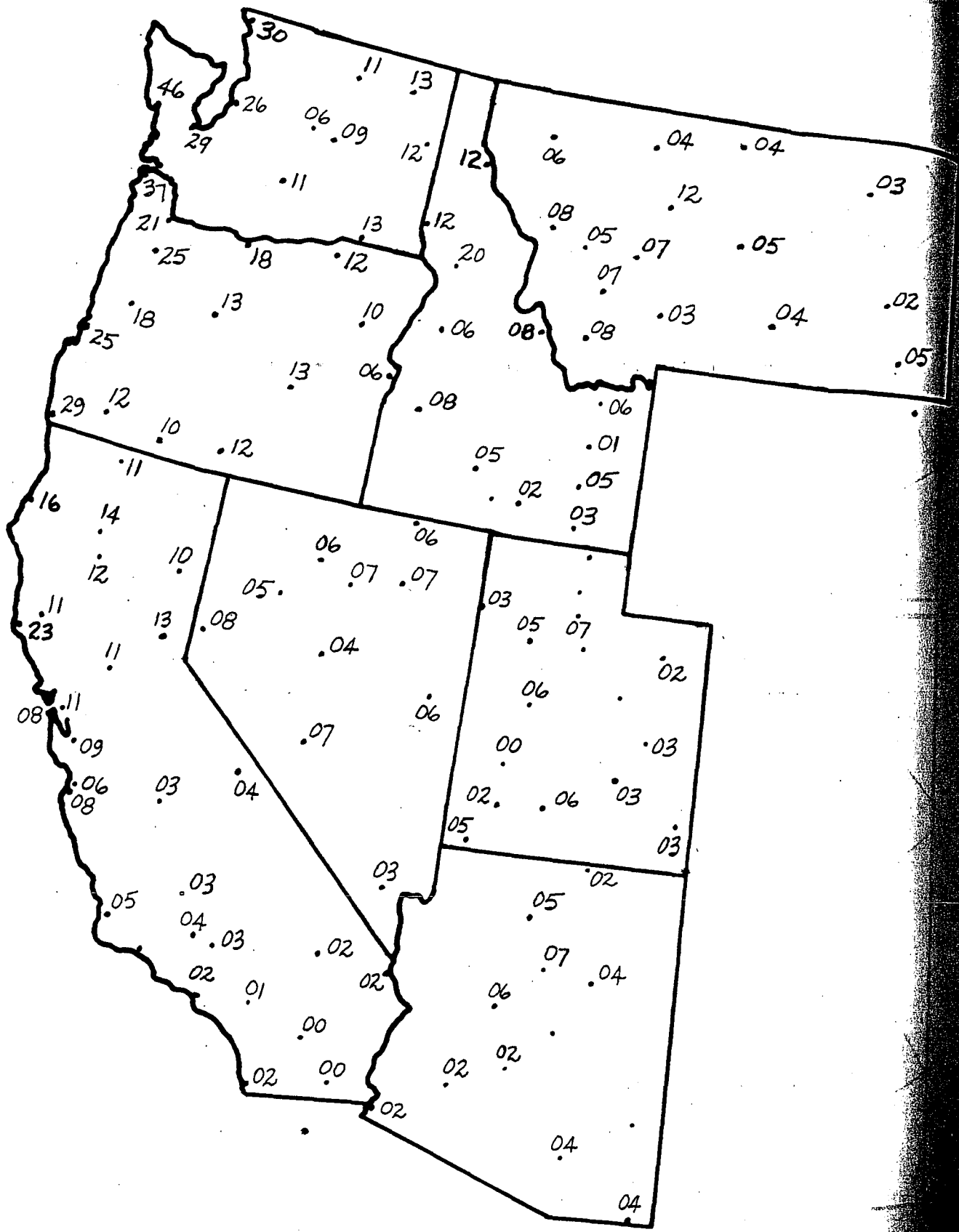
APPENDIX A

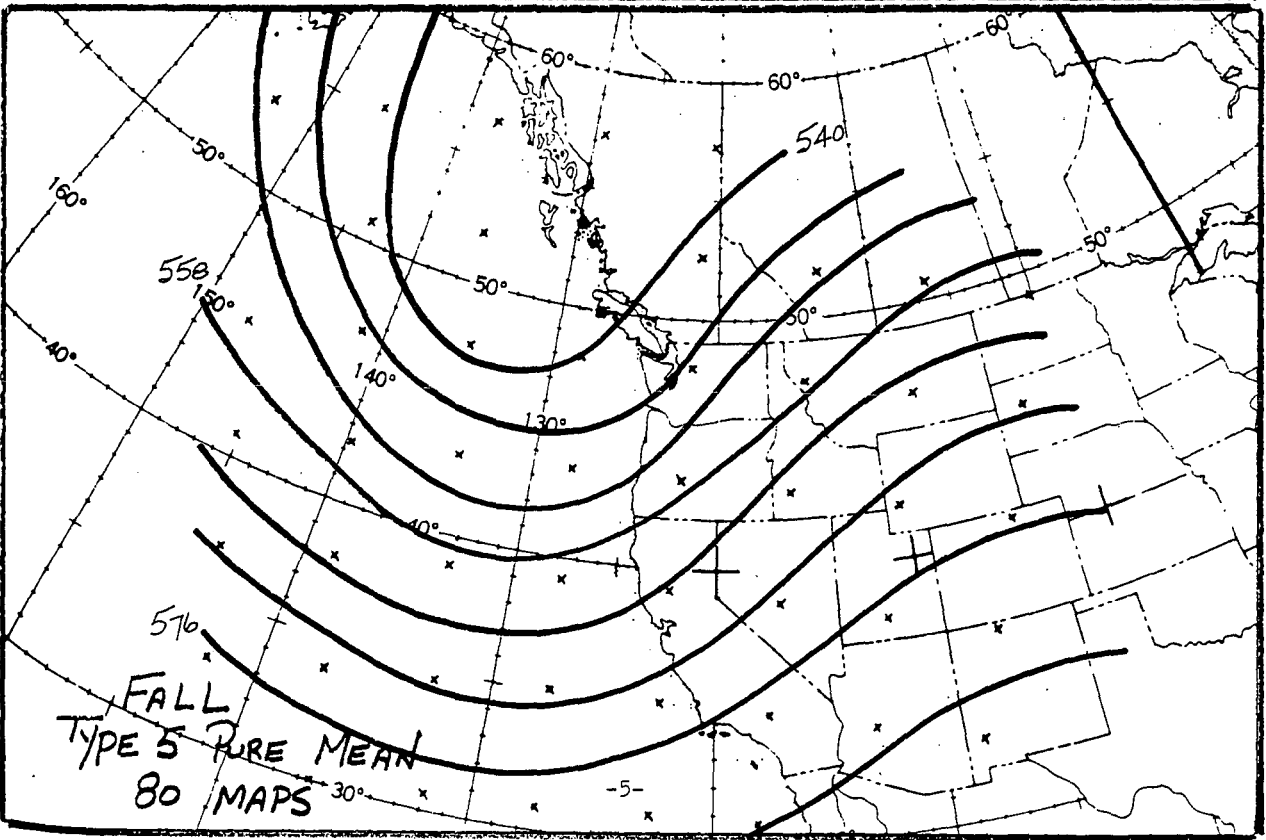
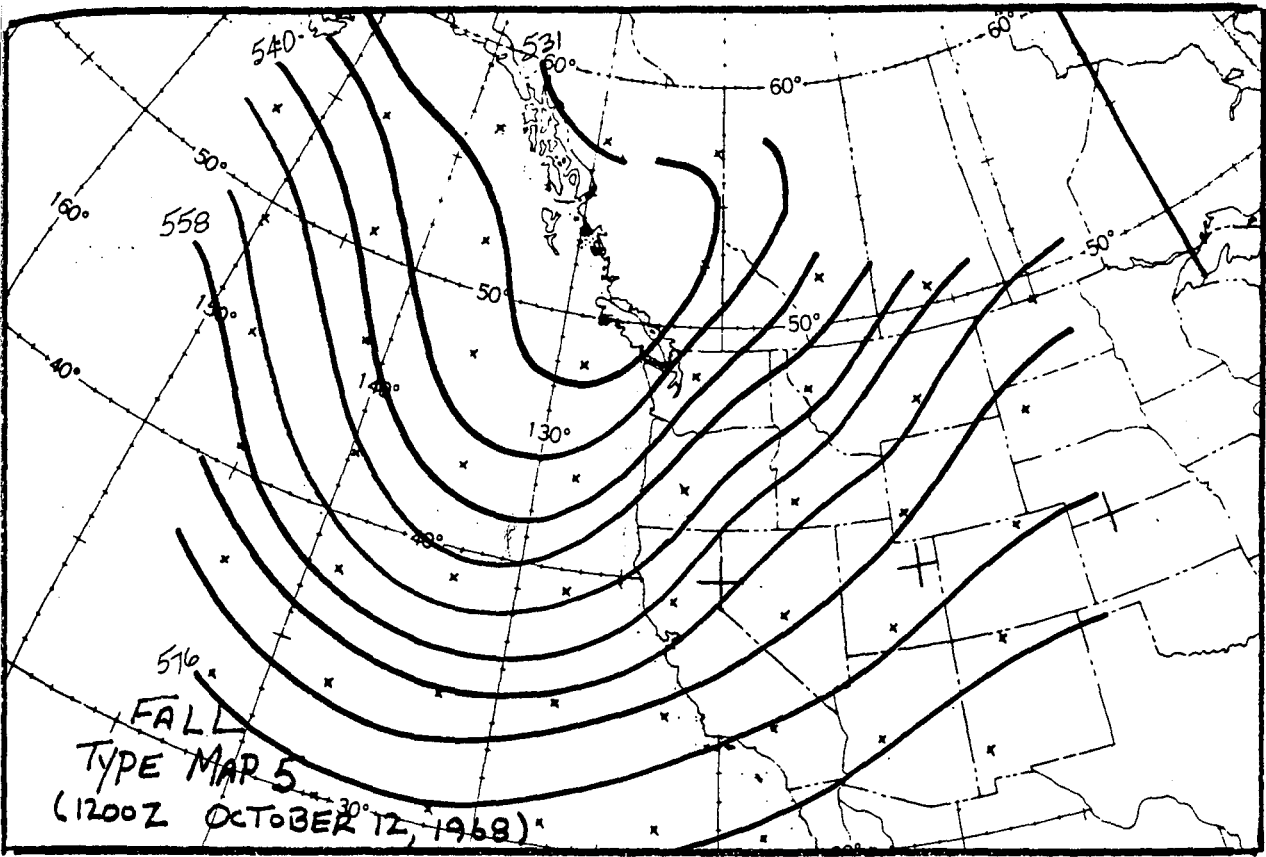
Fall Types and Associated Precipitation Climatologies

Types Arranged According to Similarity of
Basic Flow Pattern

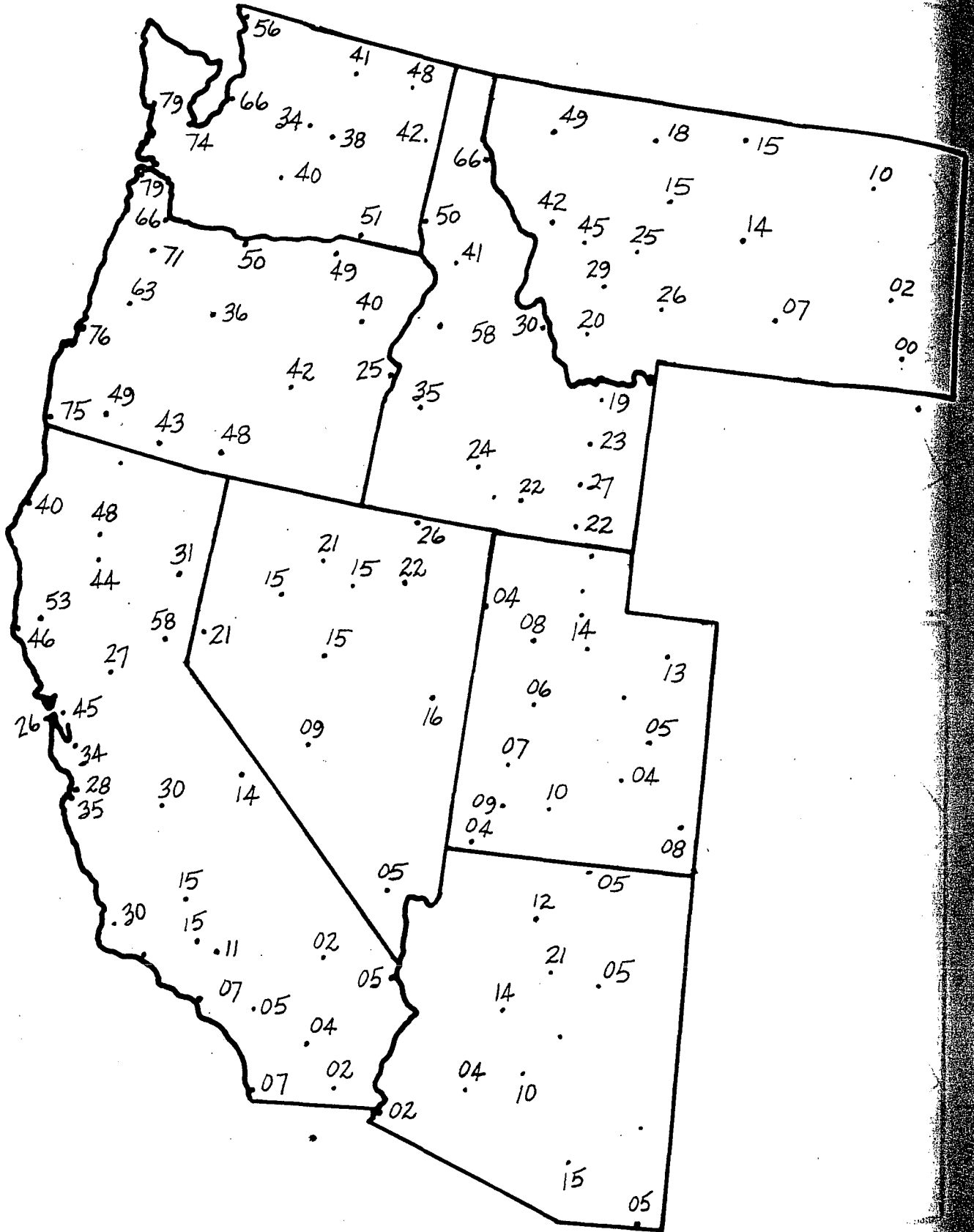


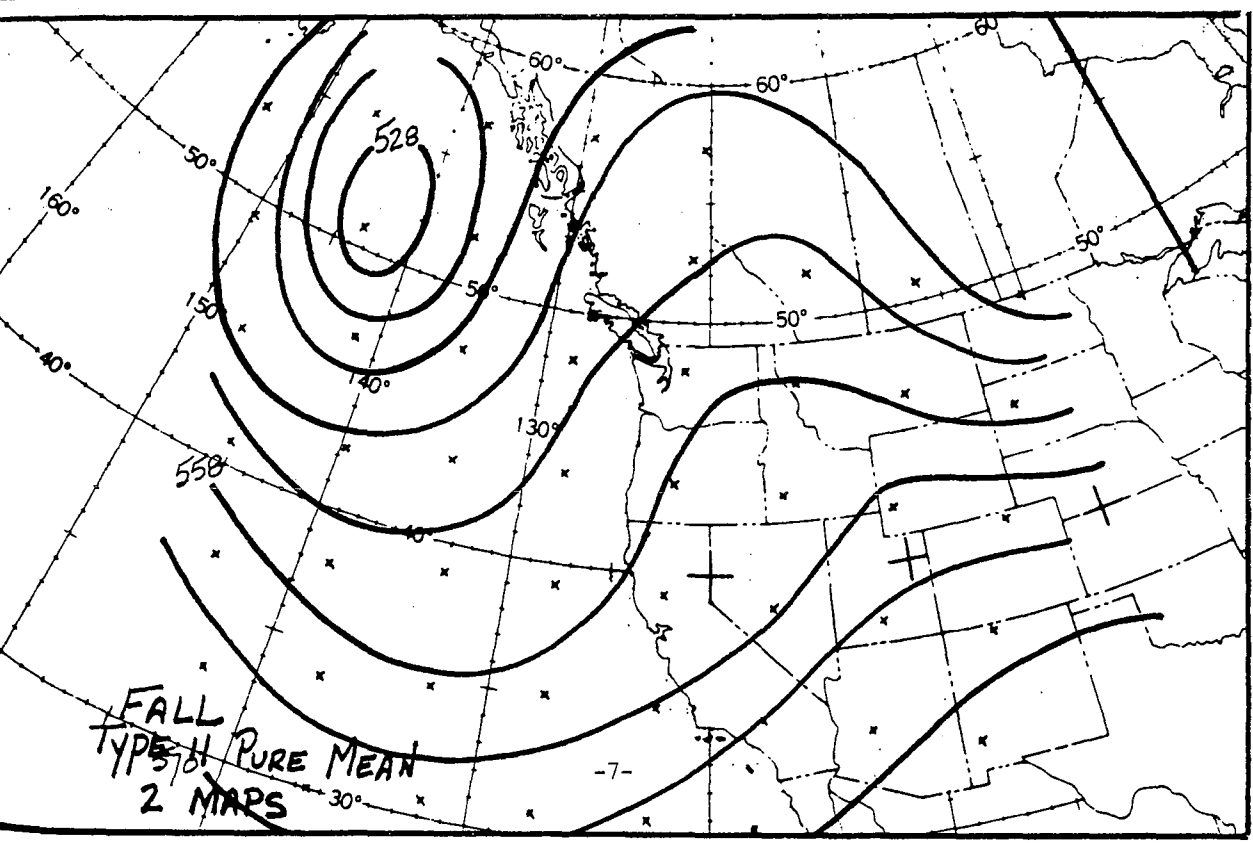
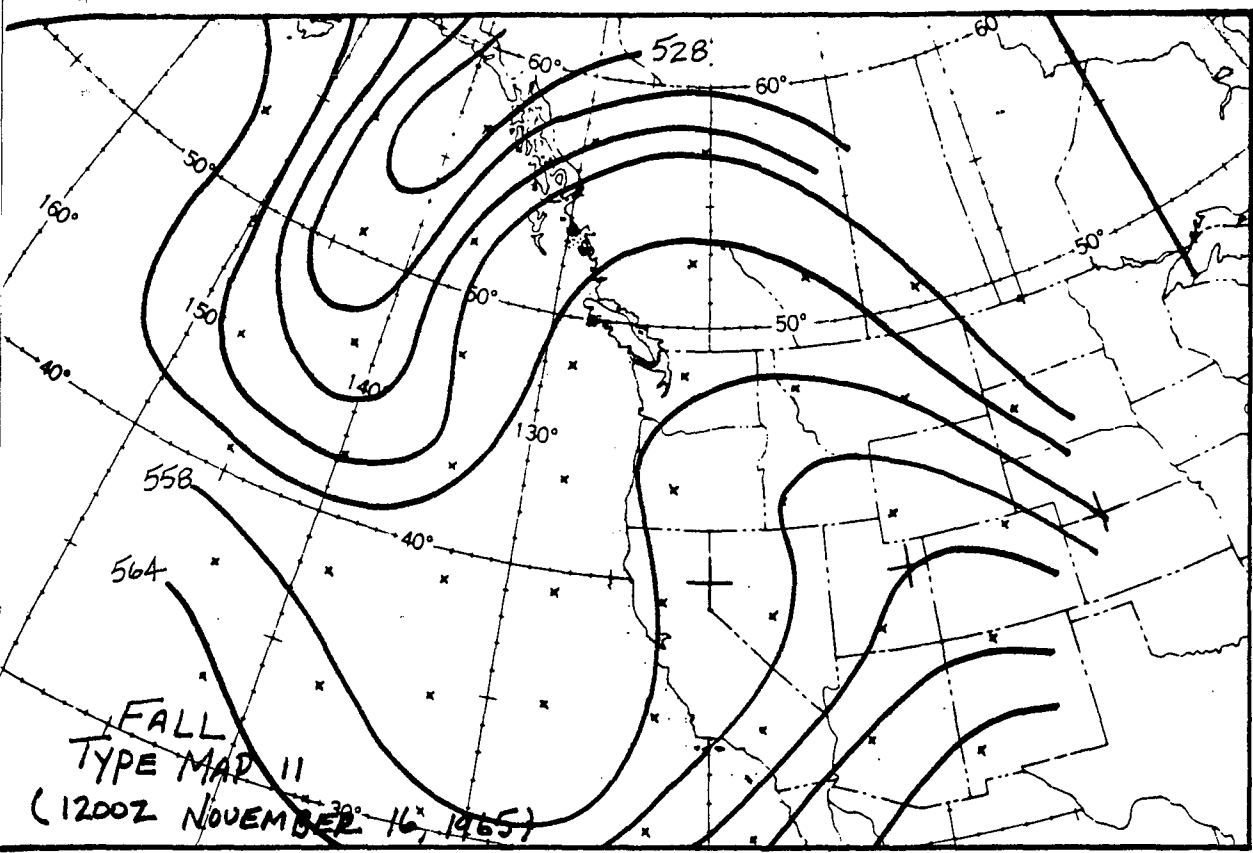
PERCENT FREQUENCY OF PRECIPITATION OCCURRENCE WITH
500-MB FALL TYPE 2



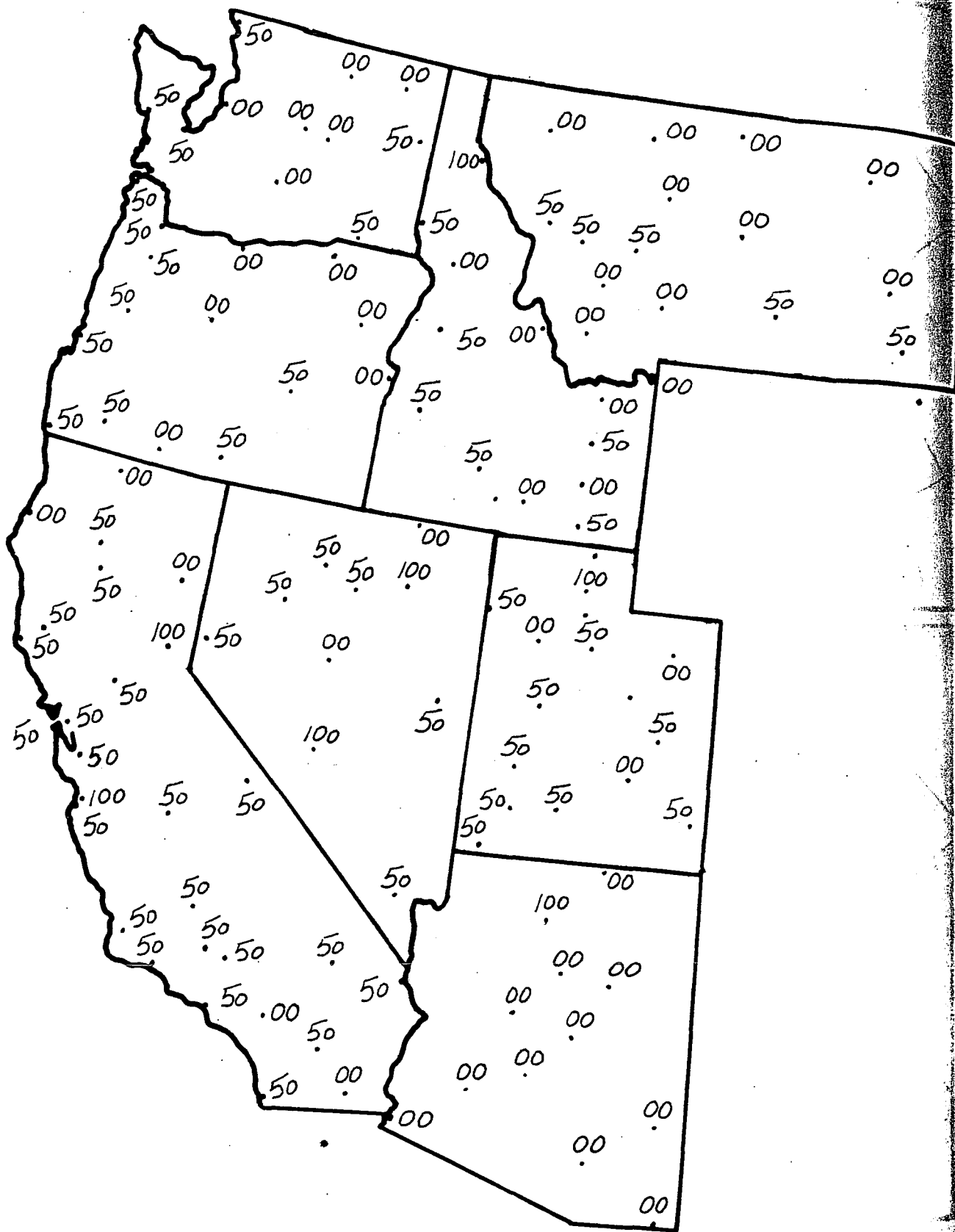


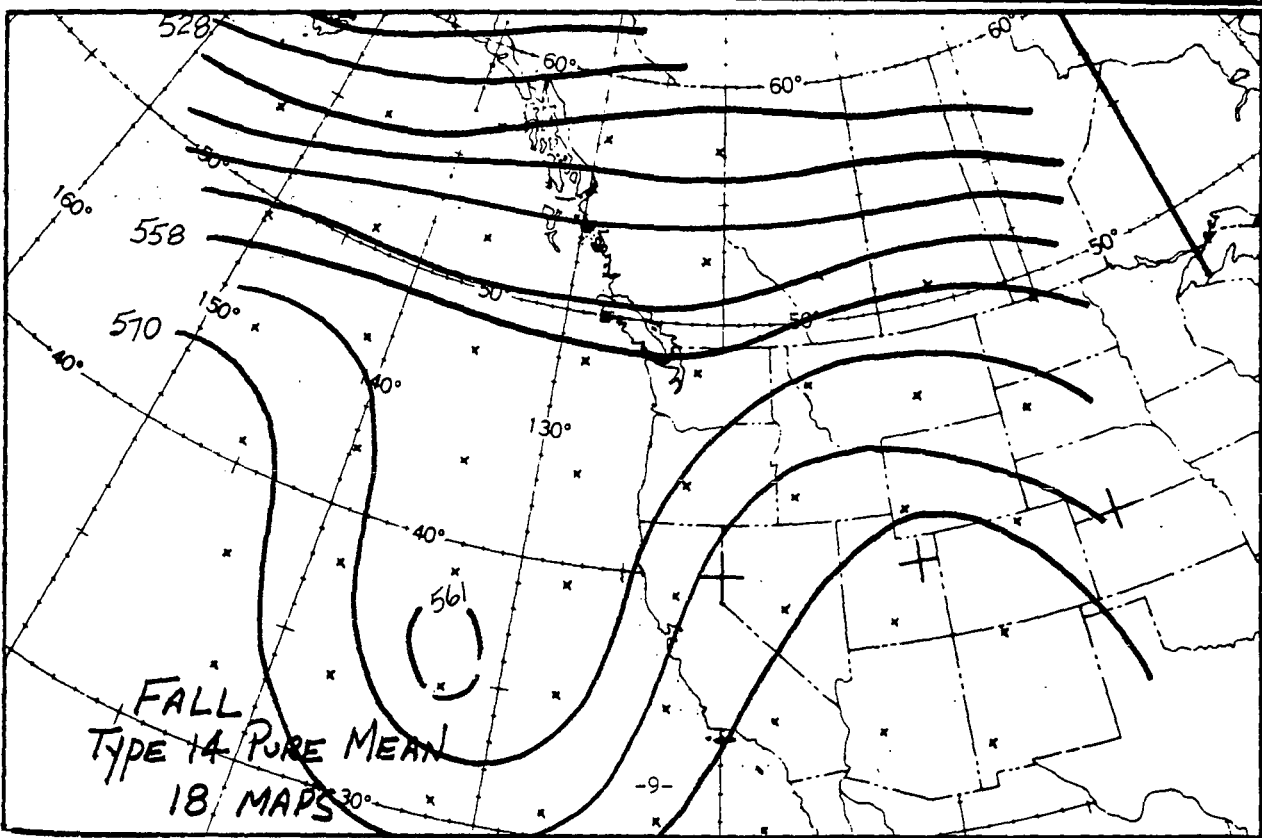
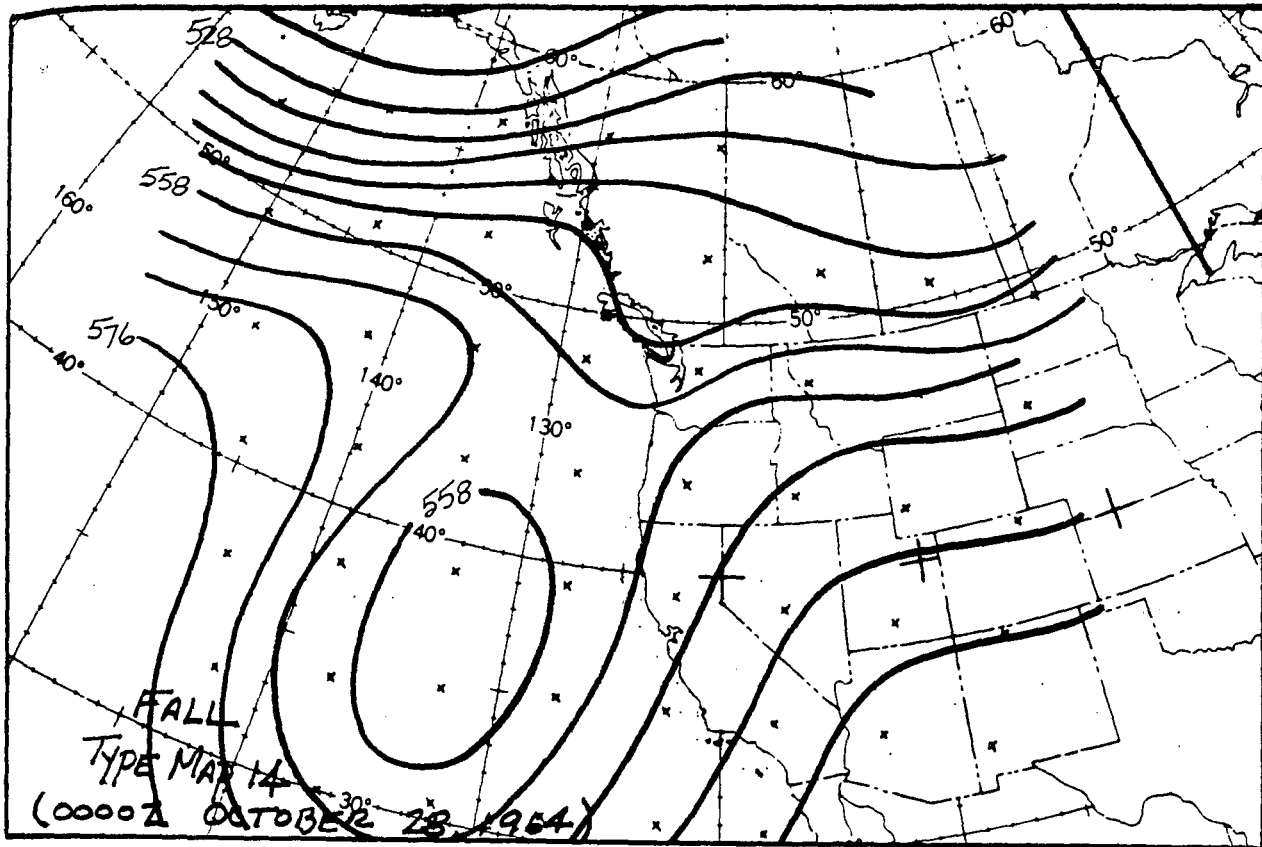
500-MB FALL TYPE 5

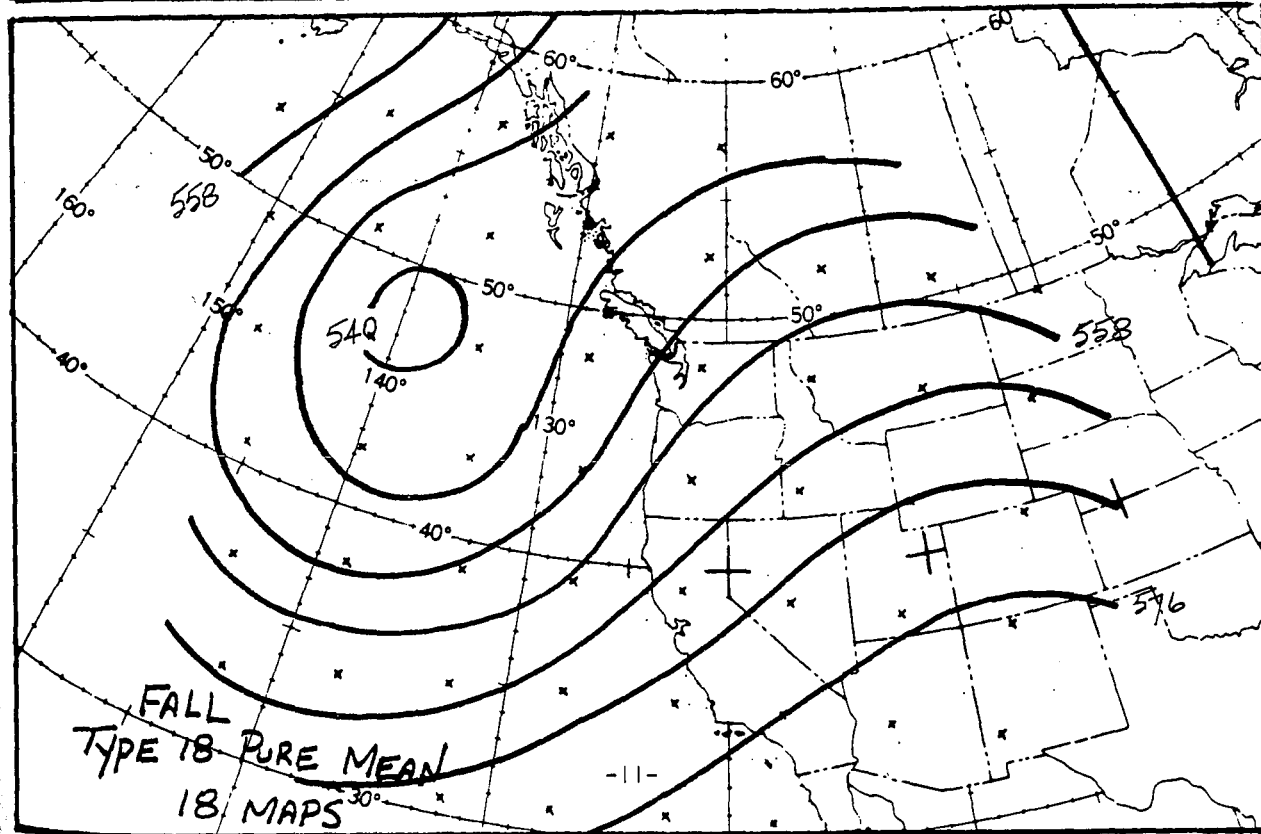
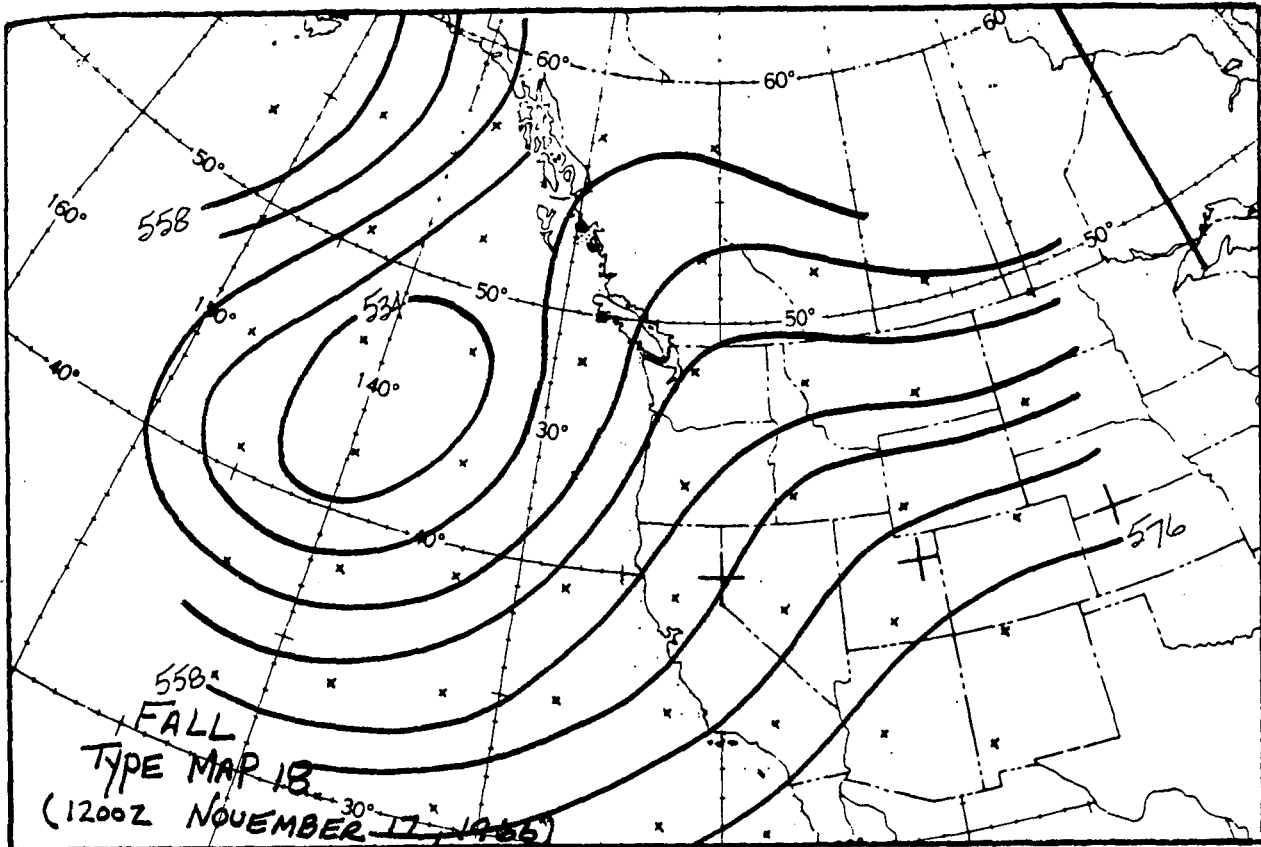


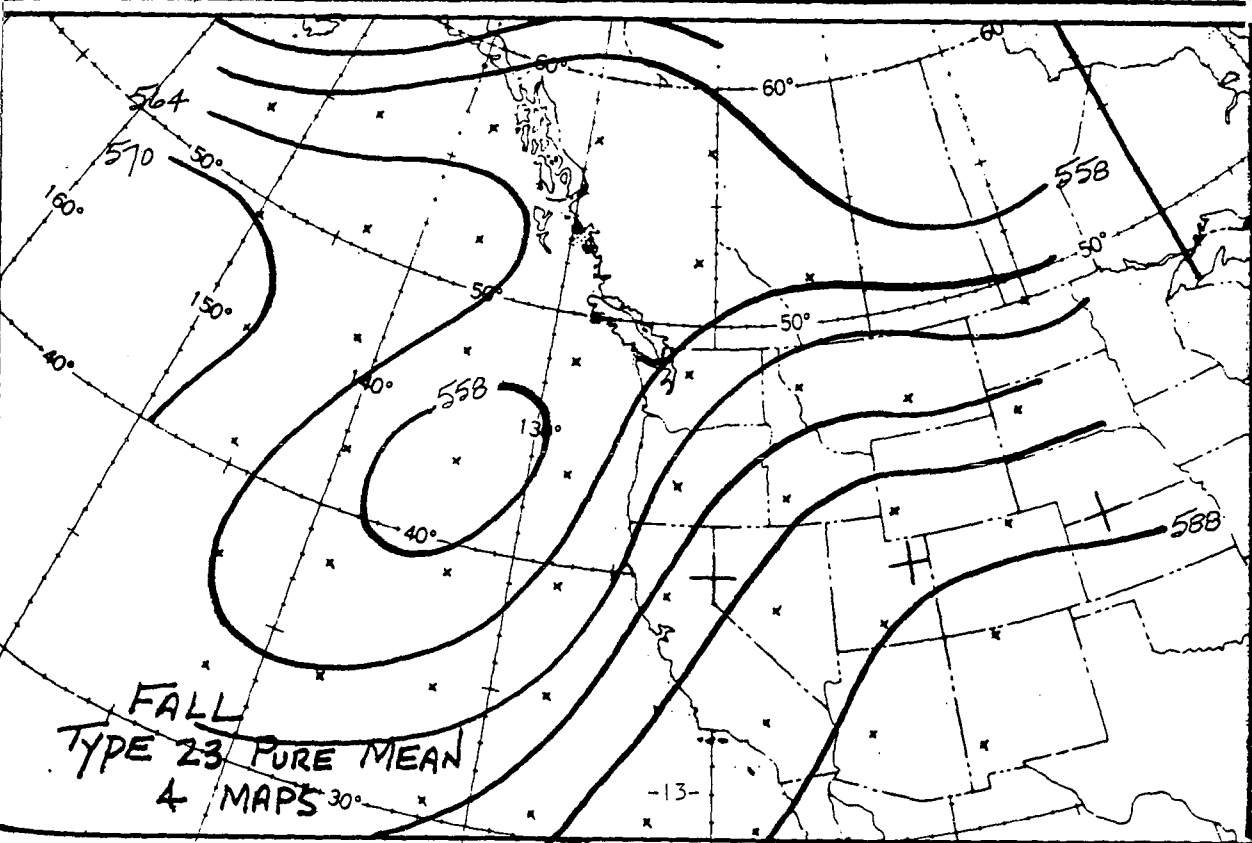
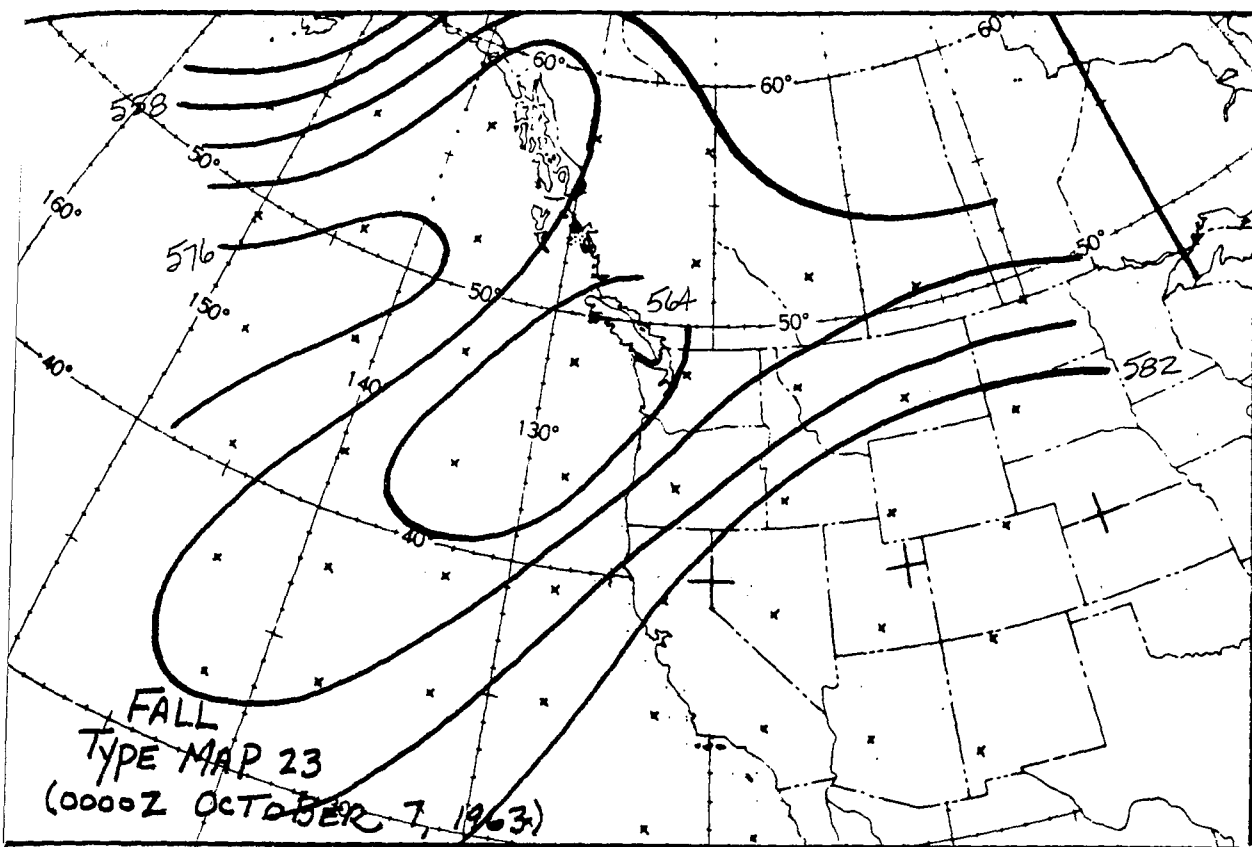


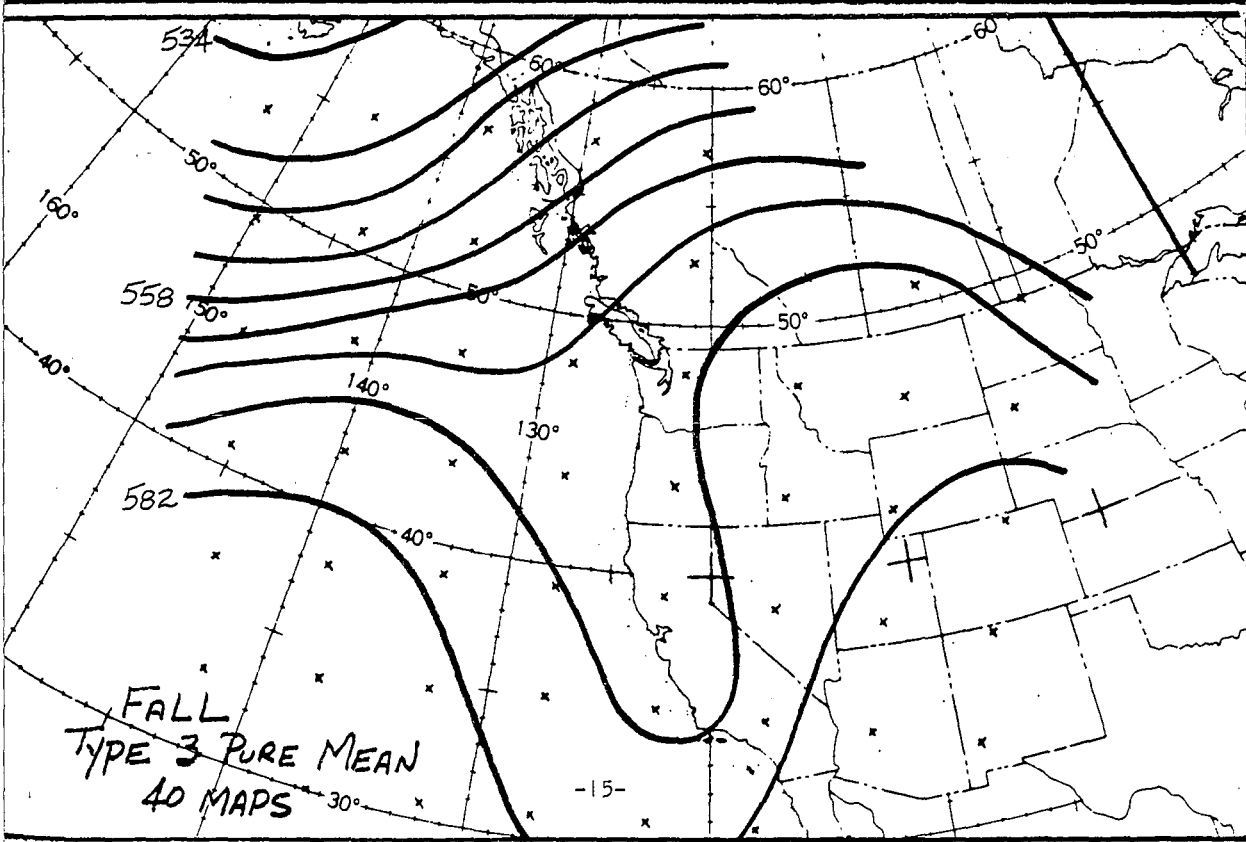
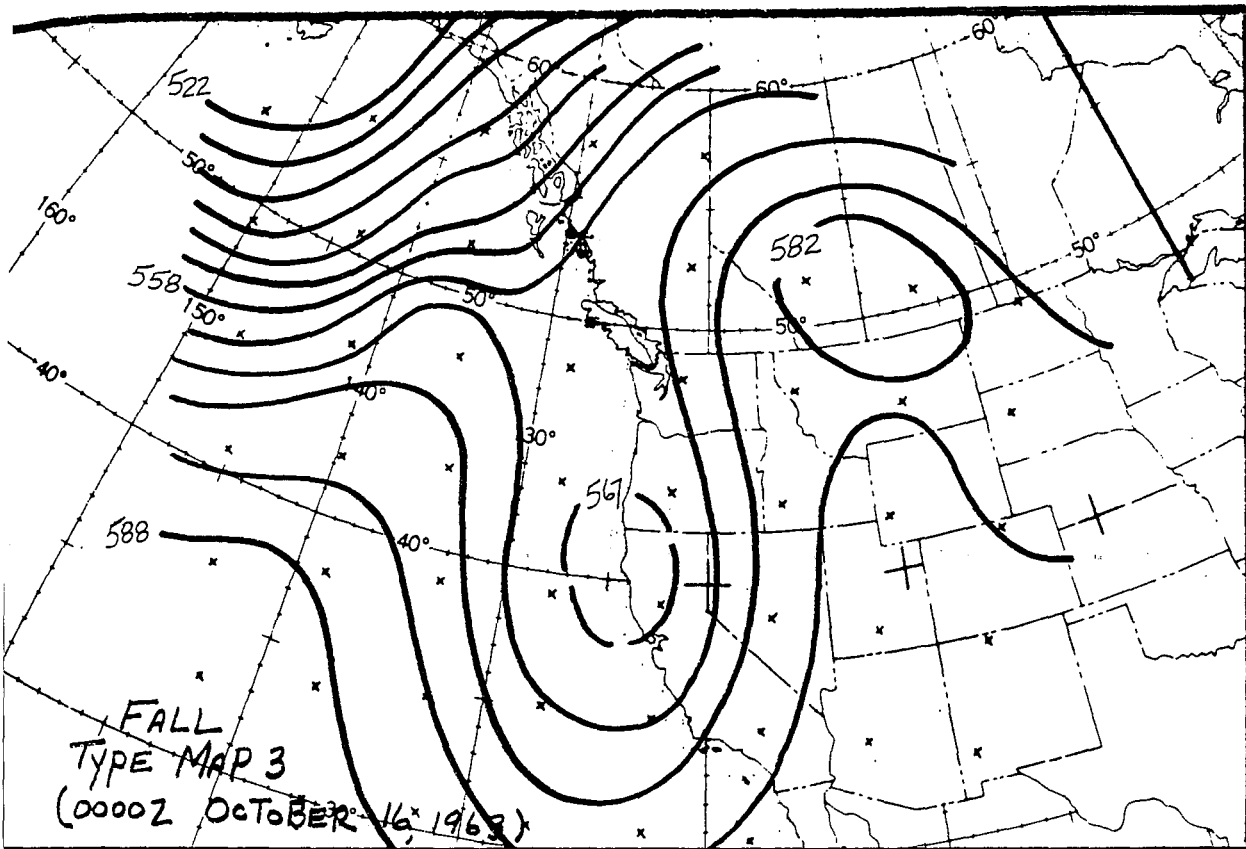
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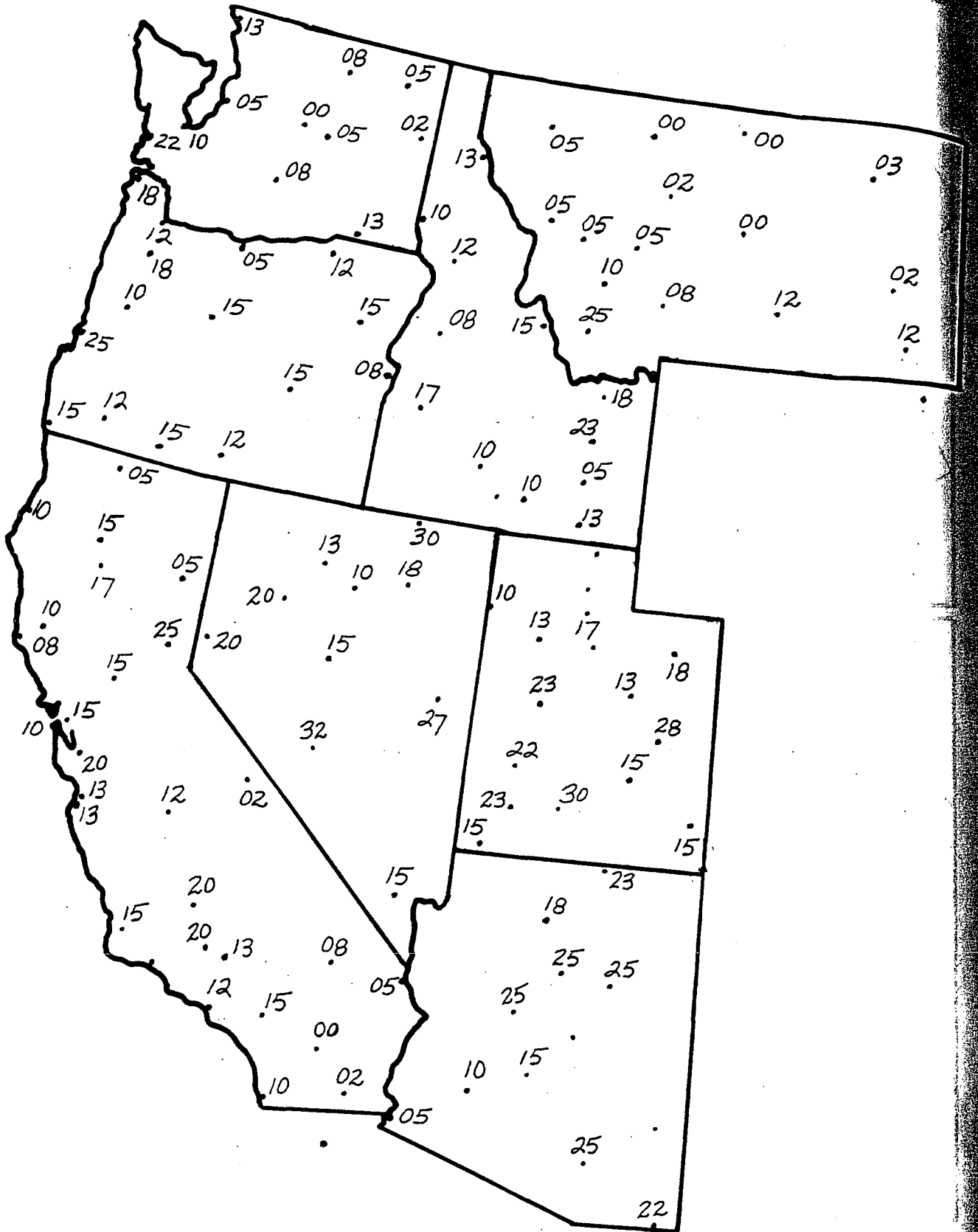


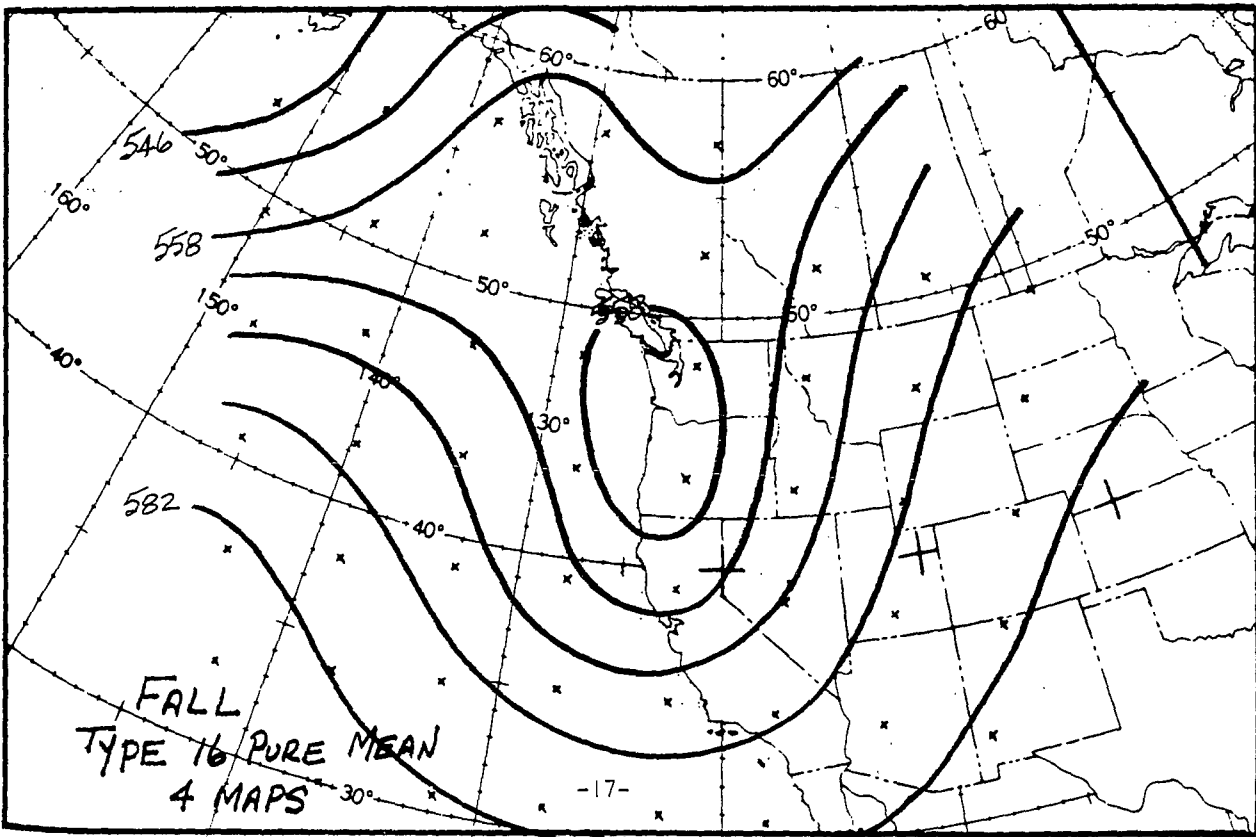
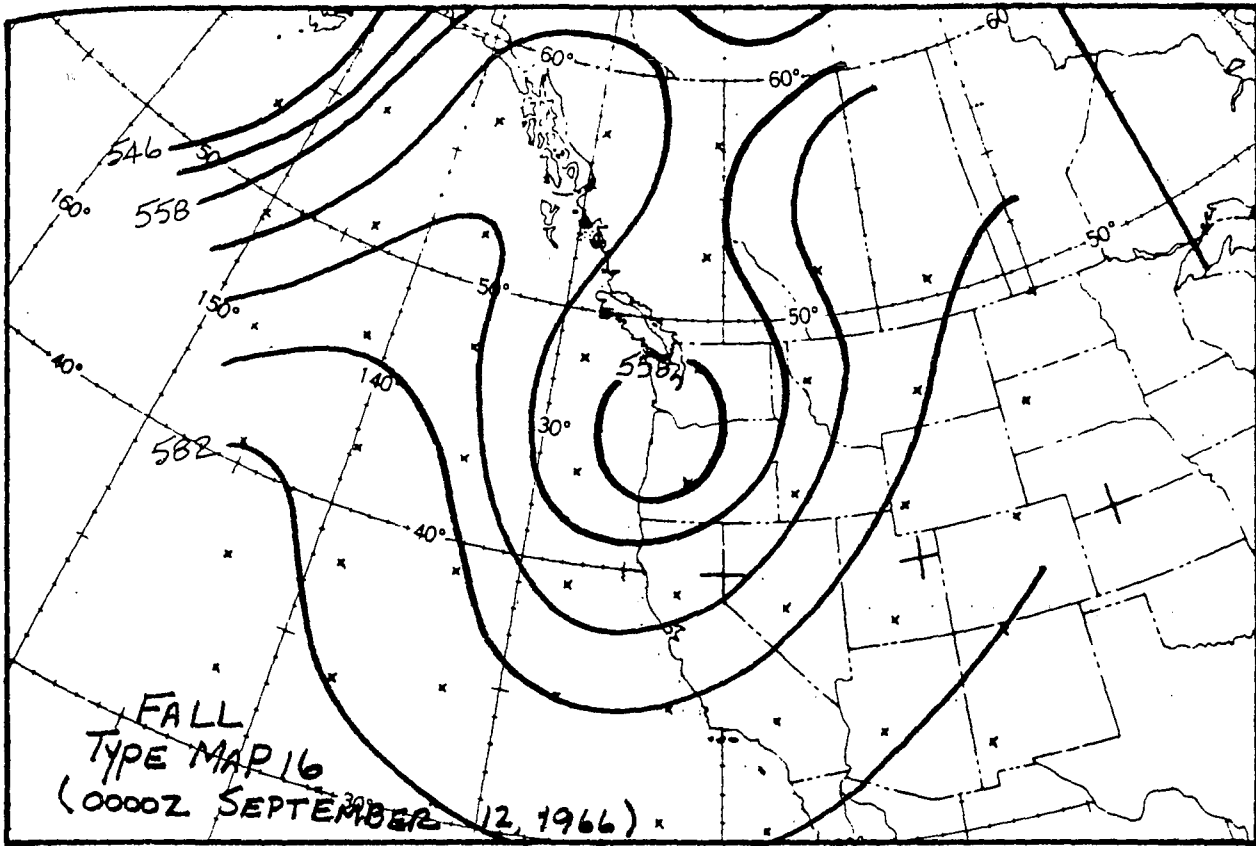


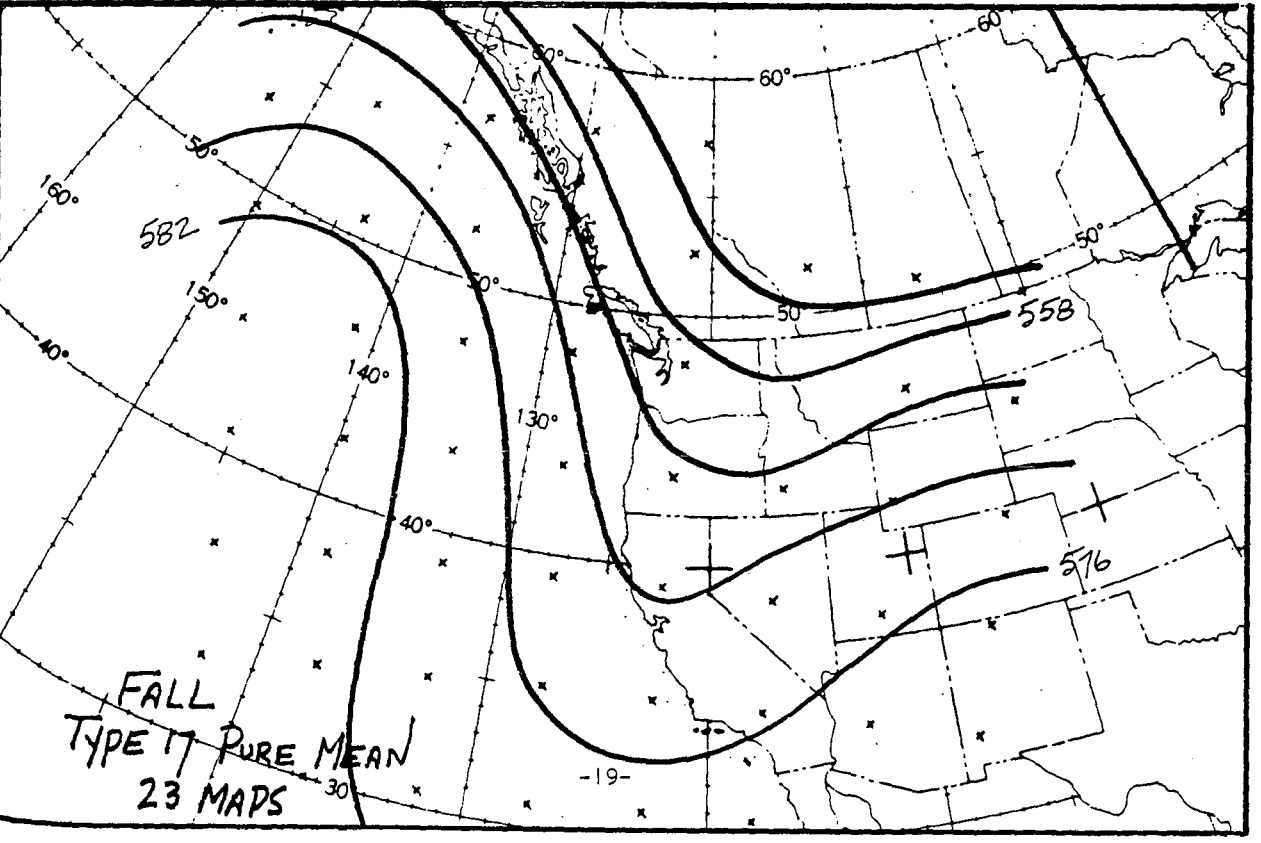
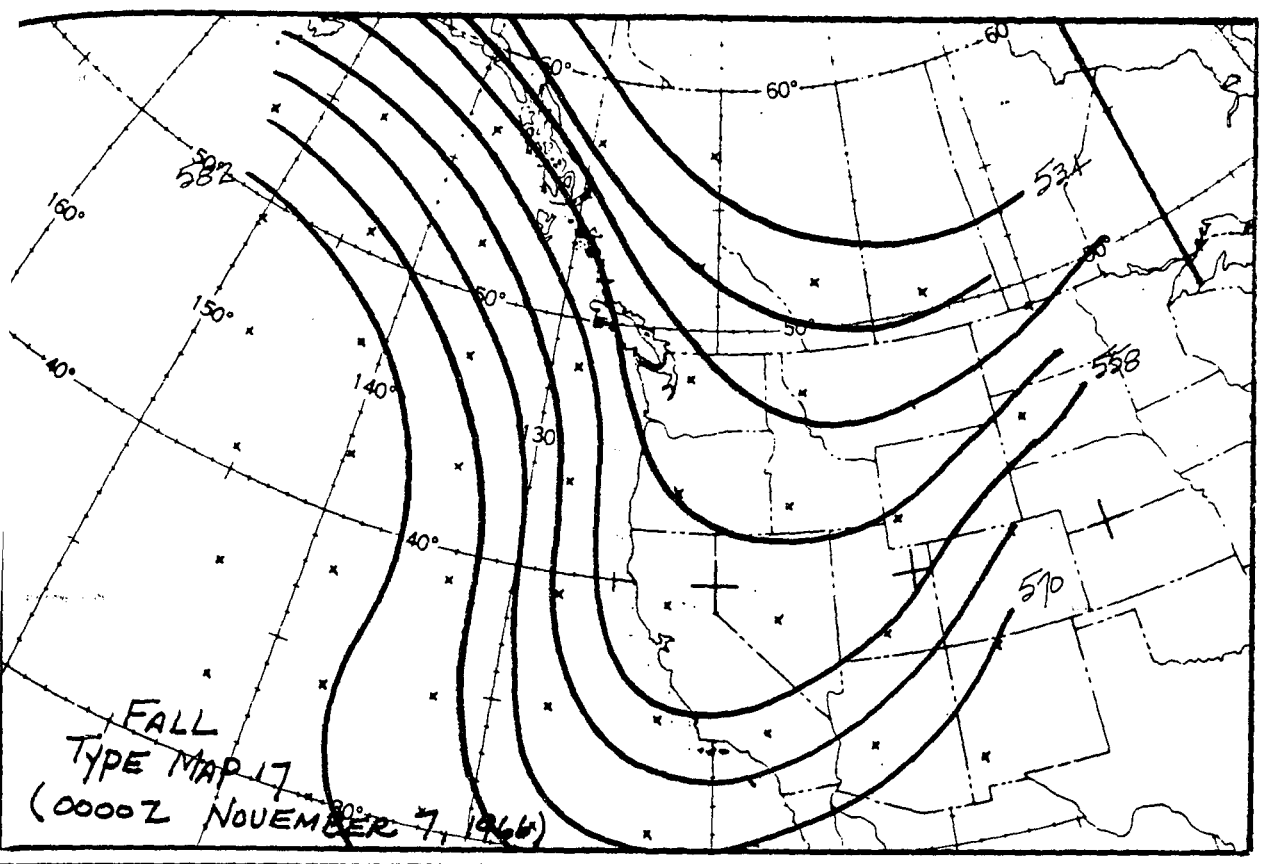




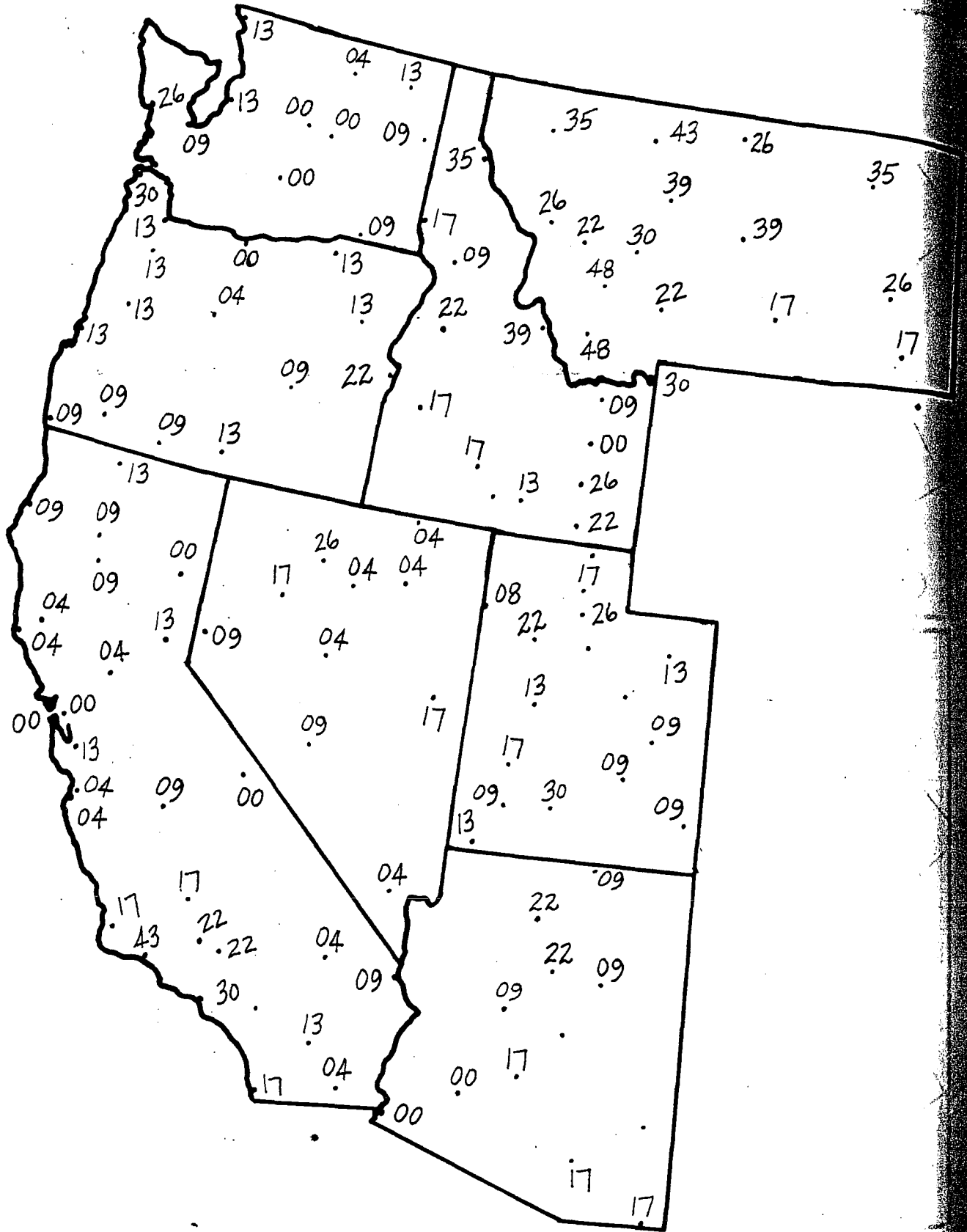
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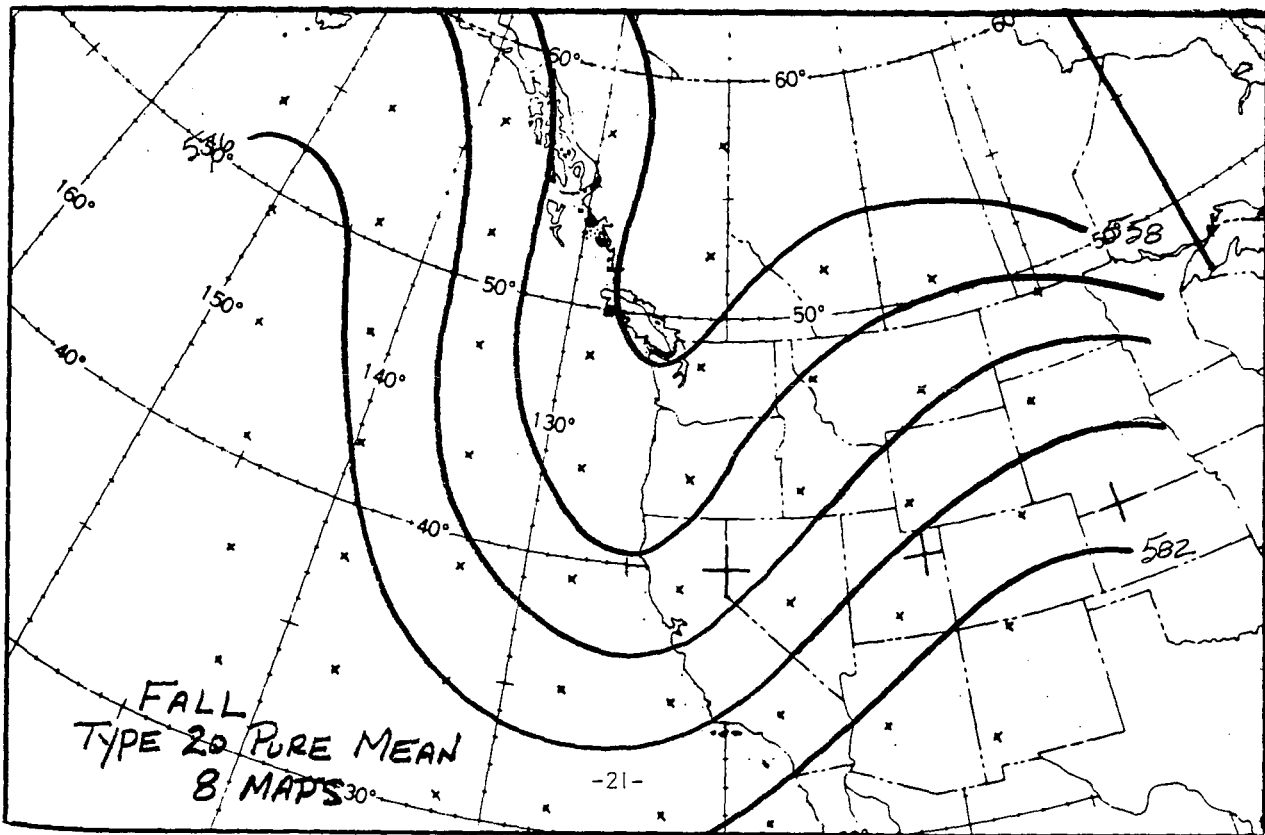
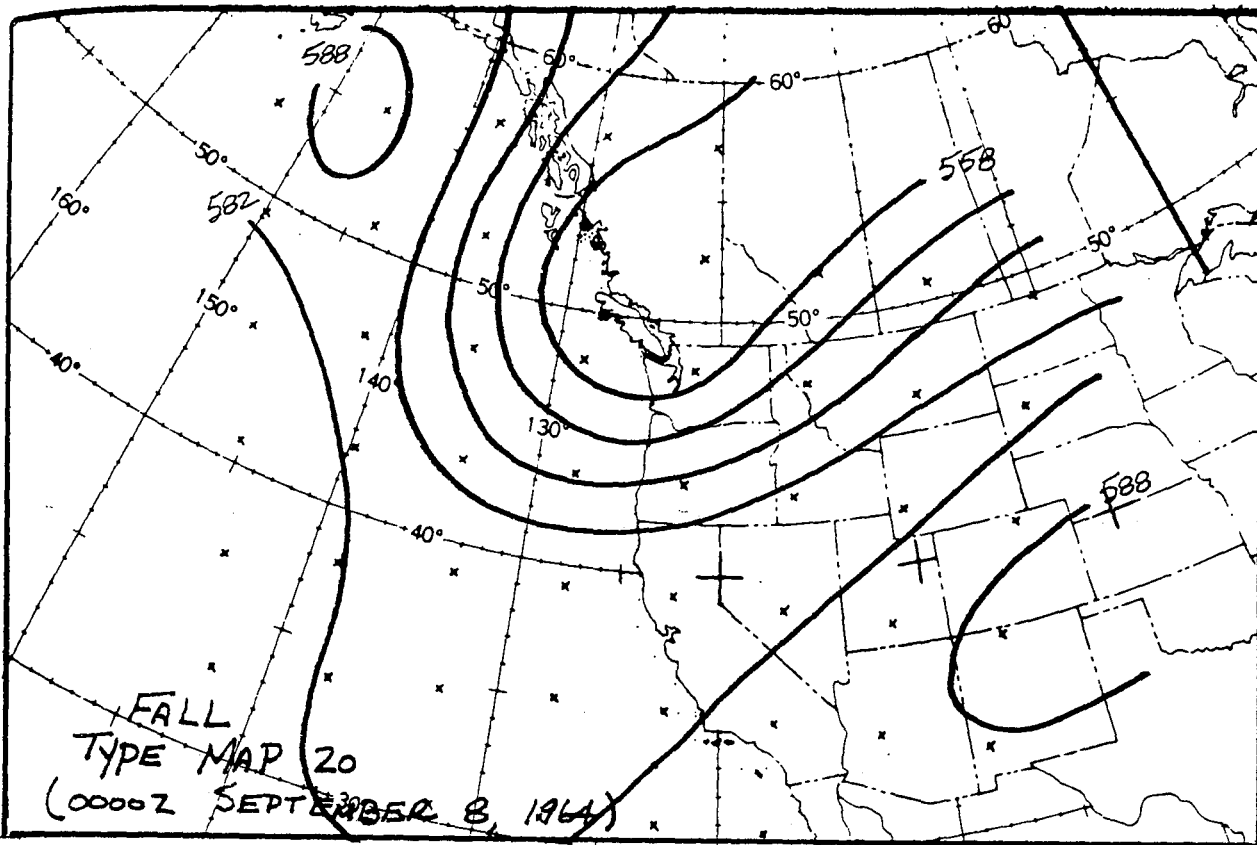


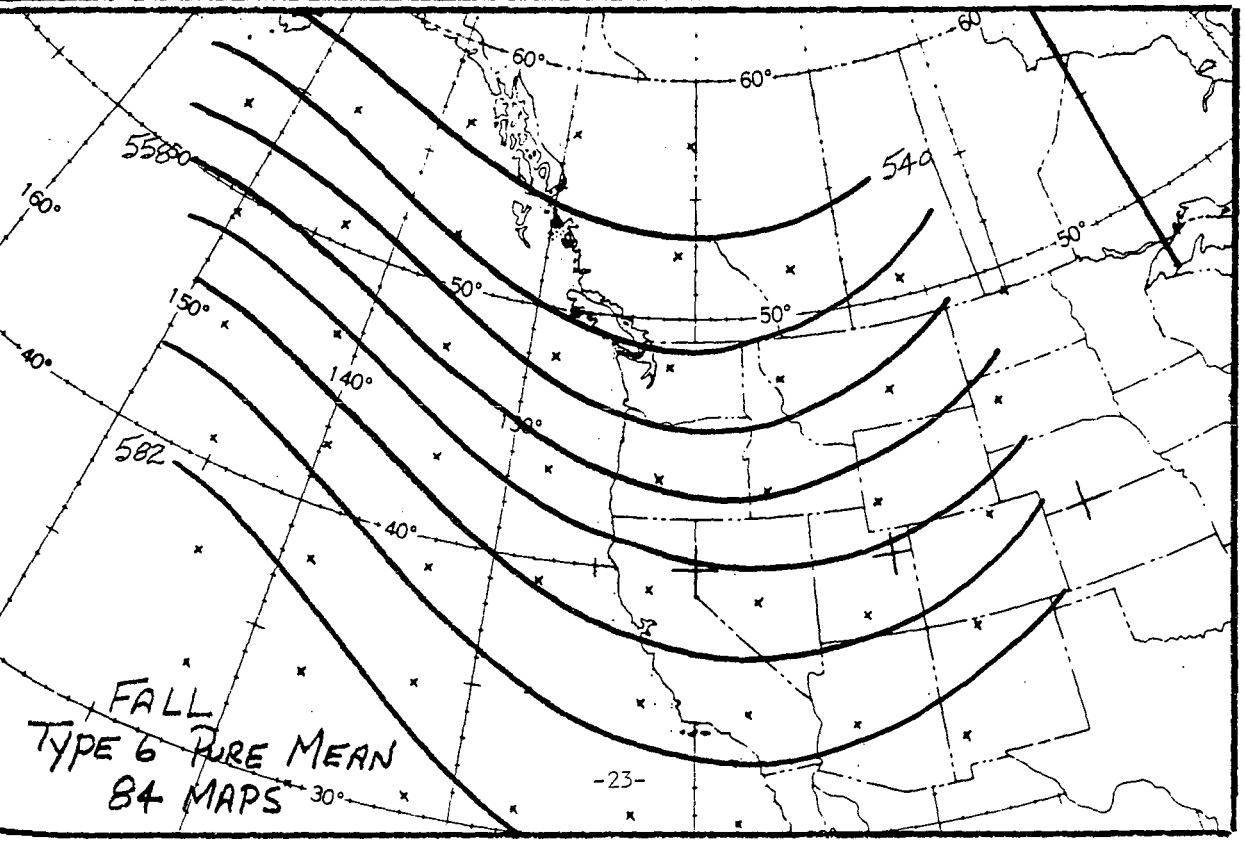
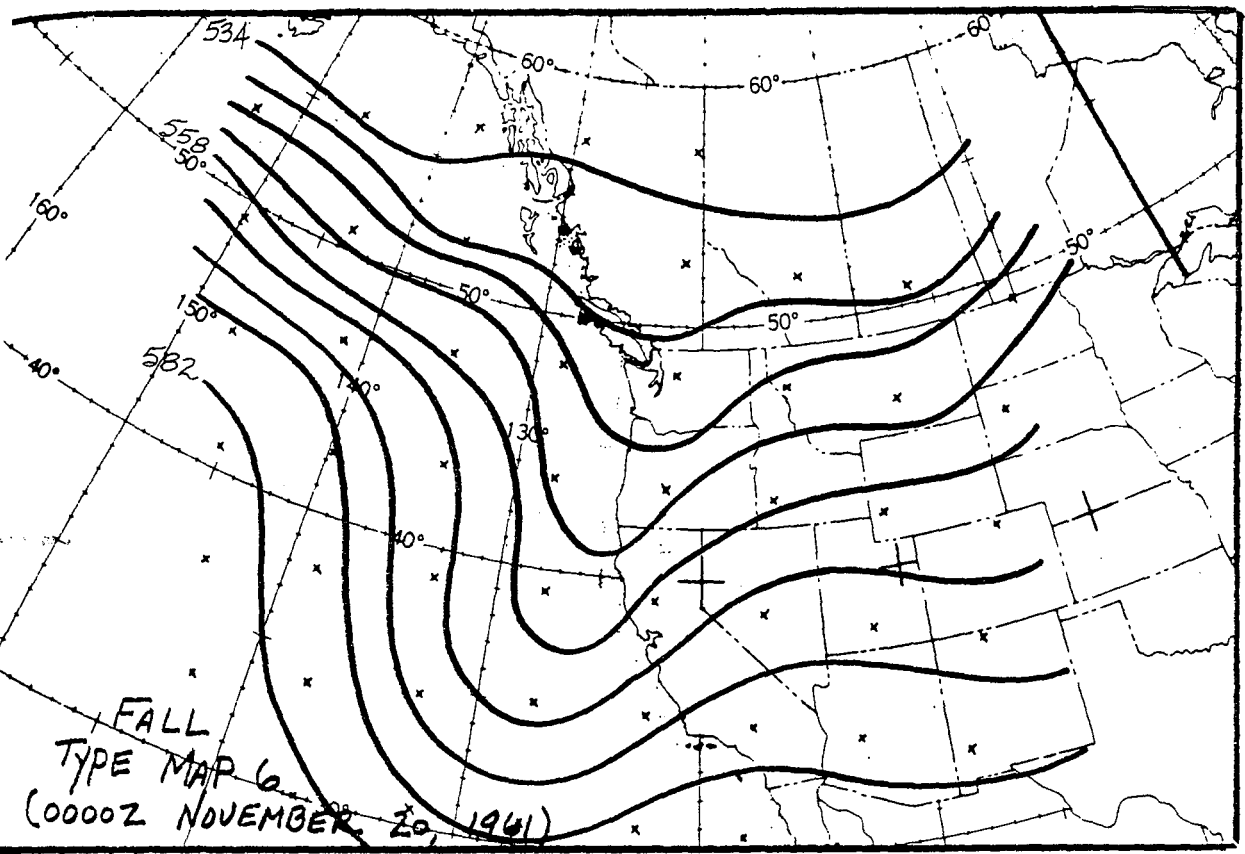




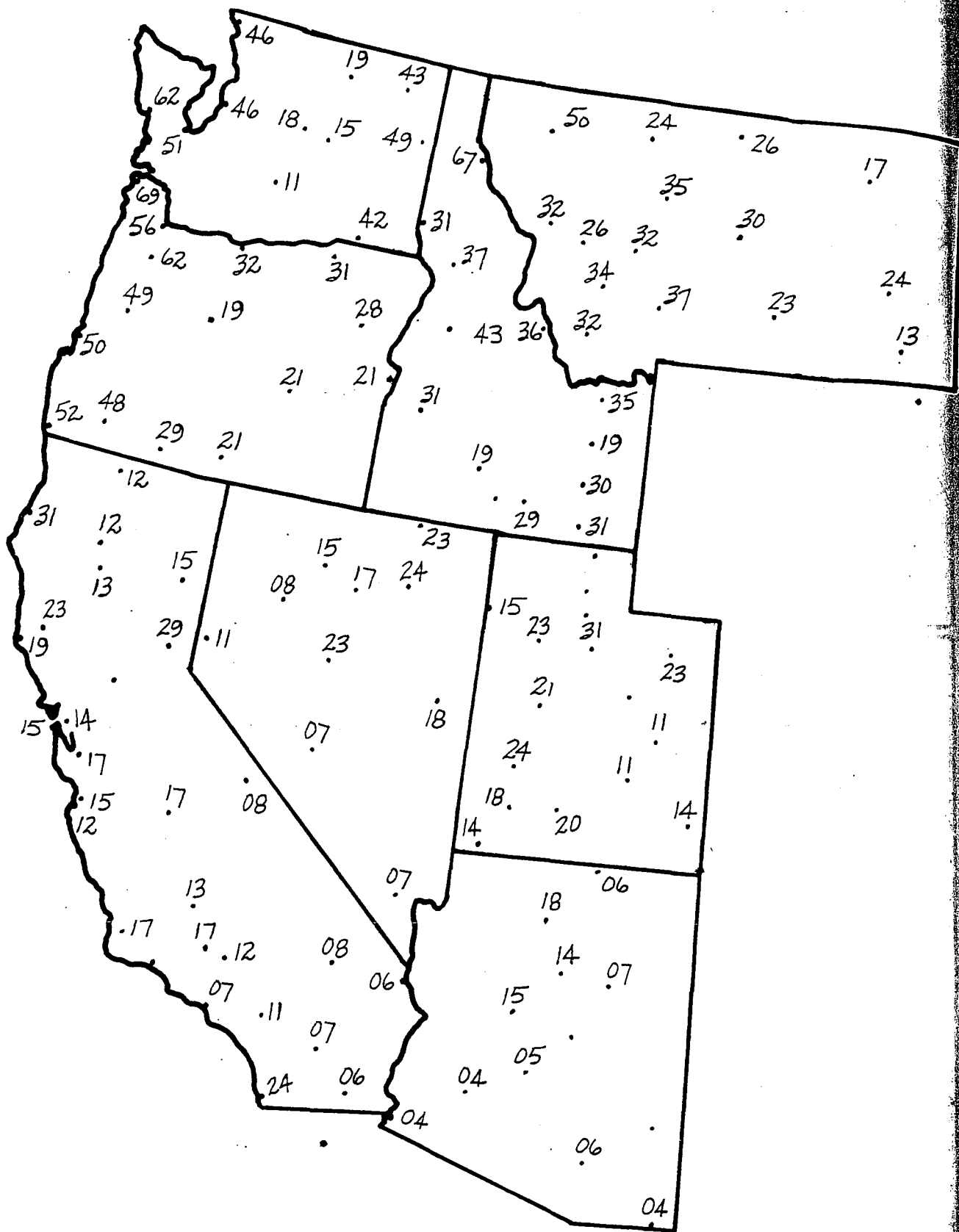
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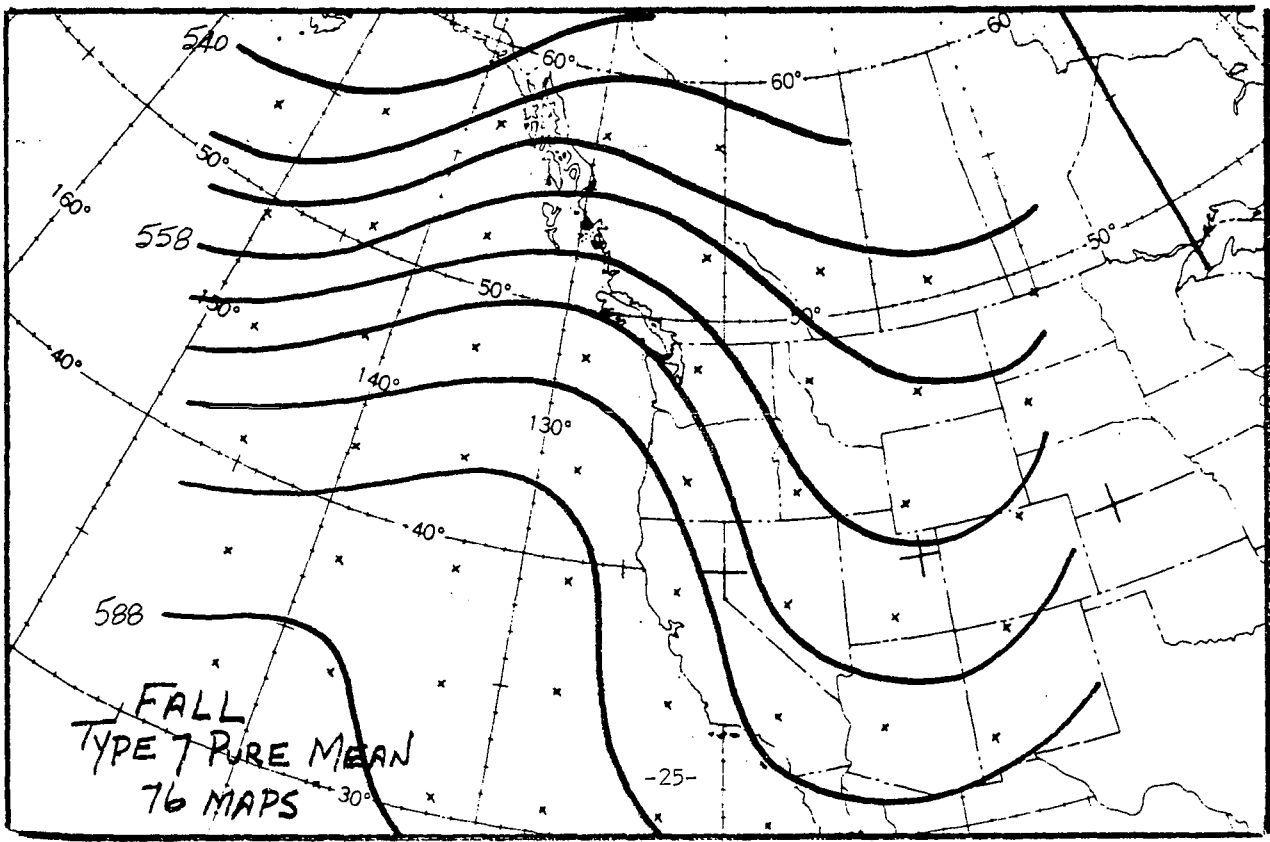
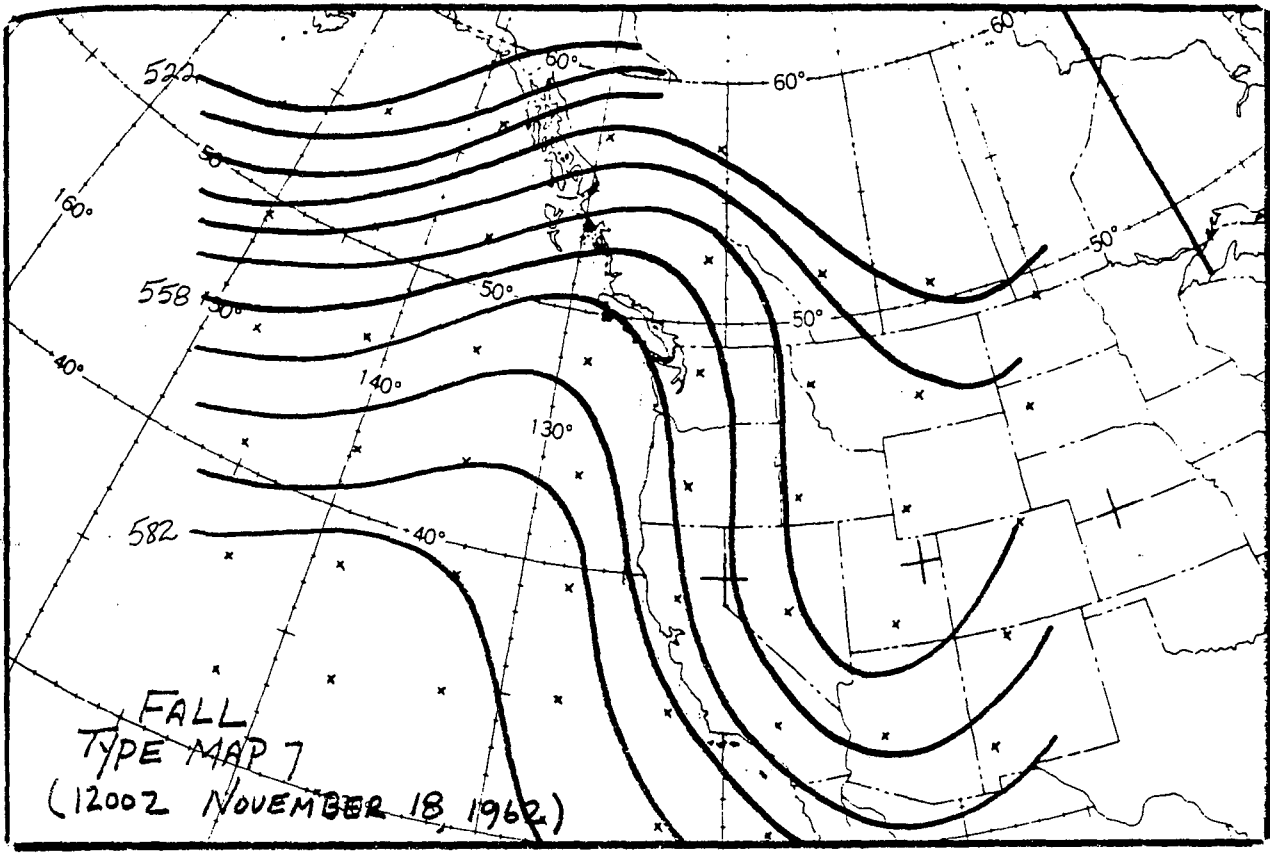




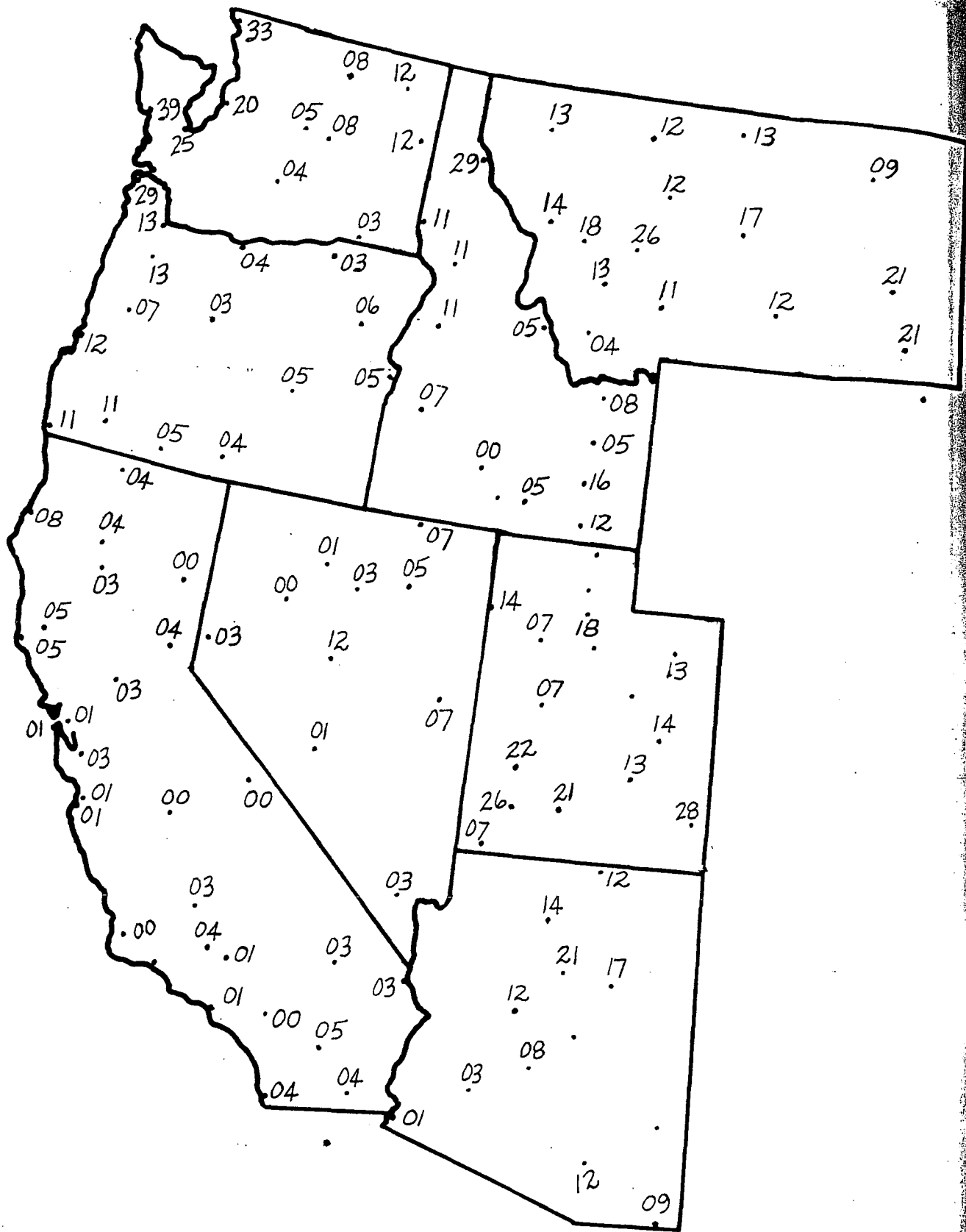


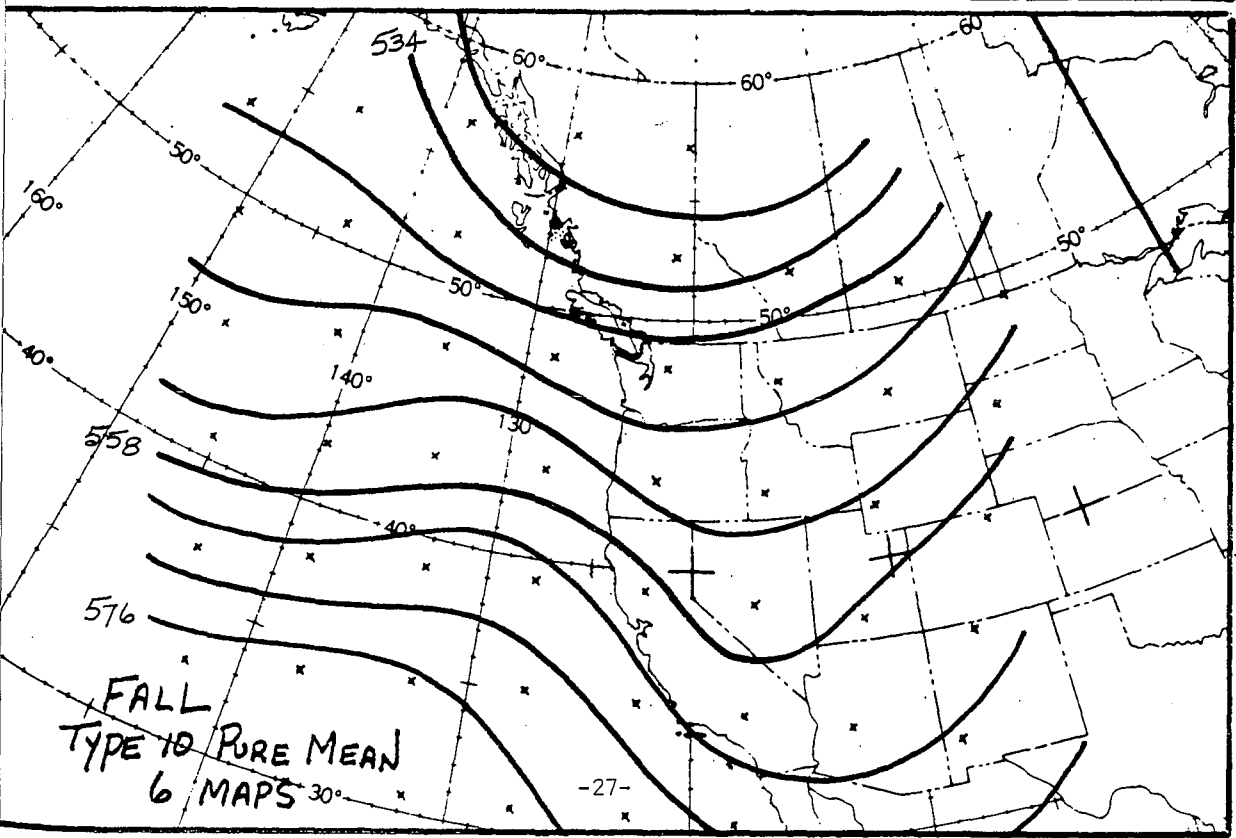
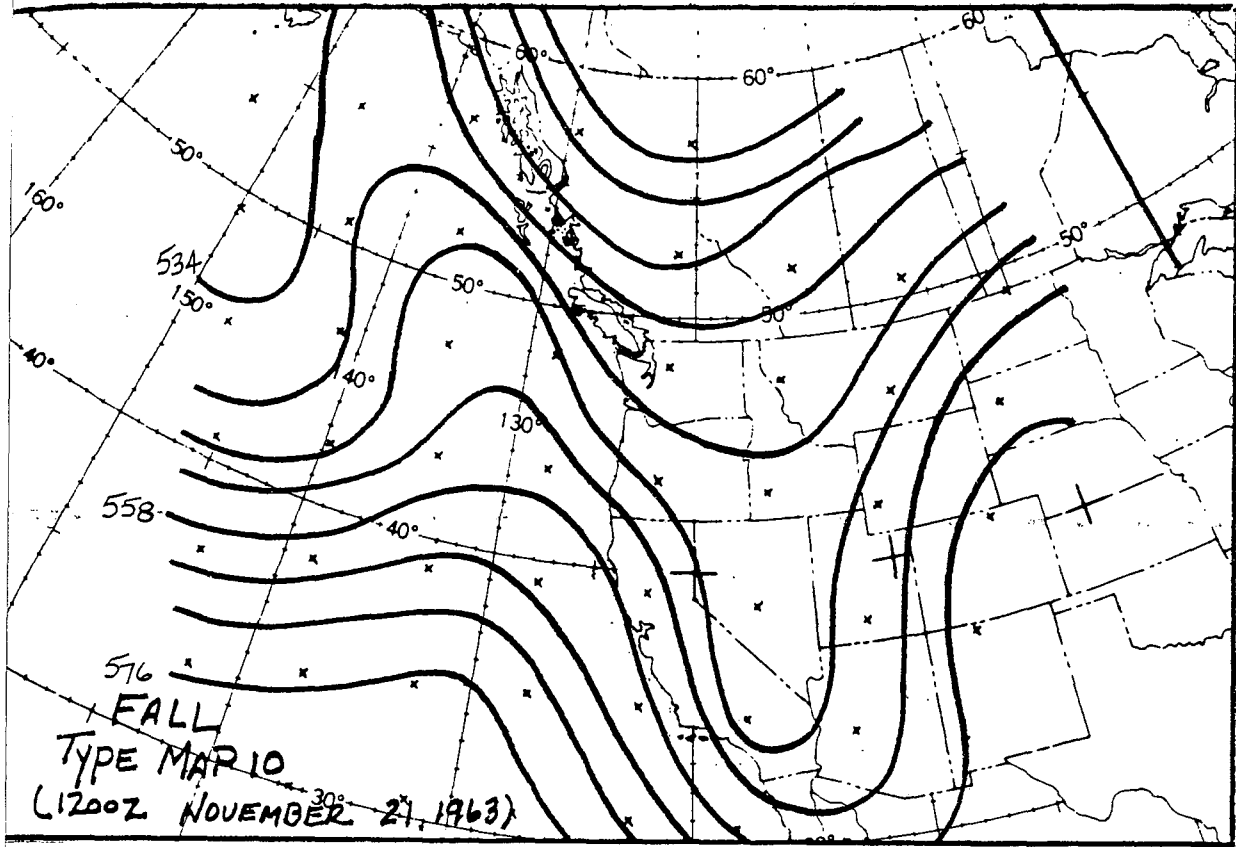
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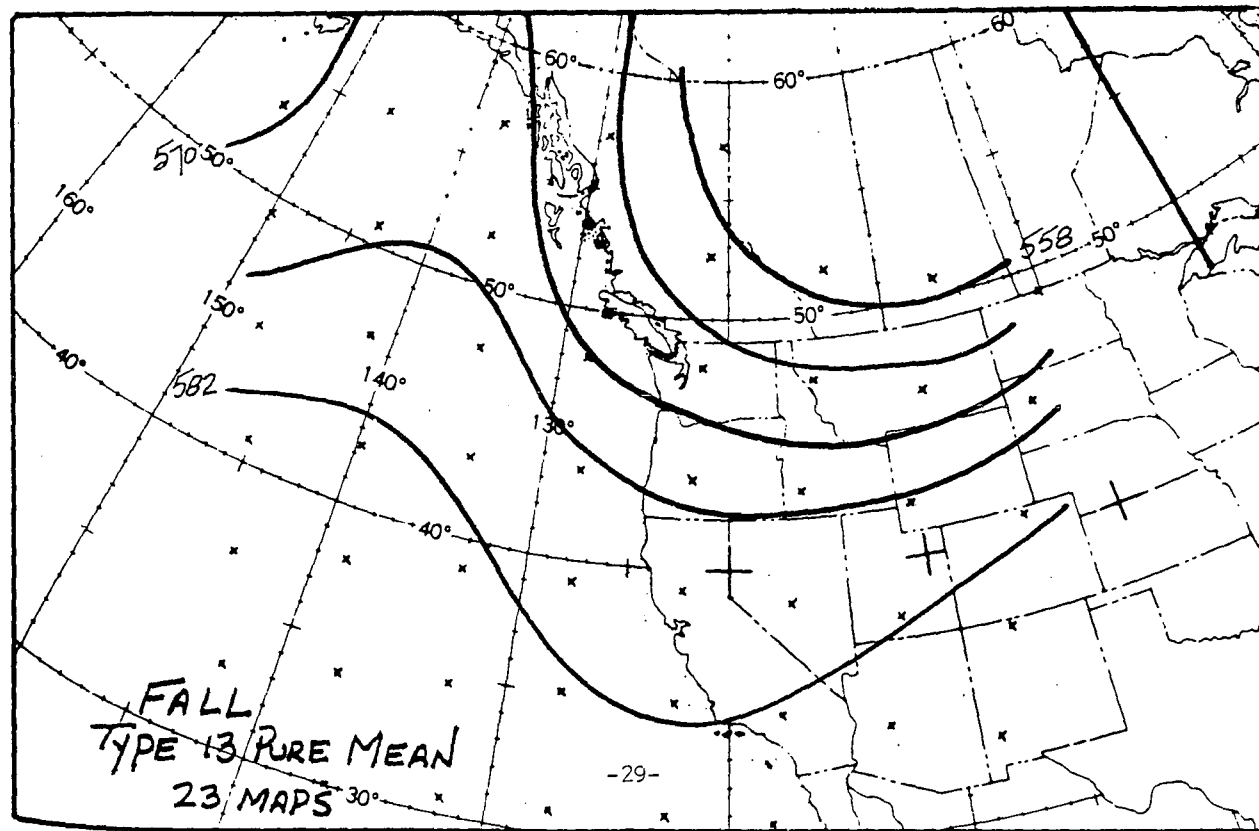
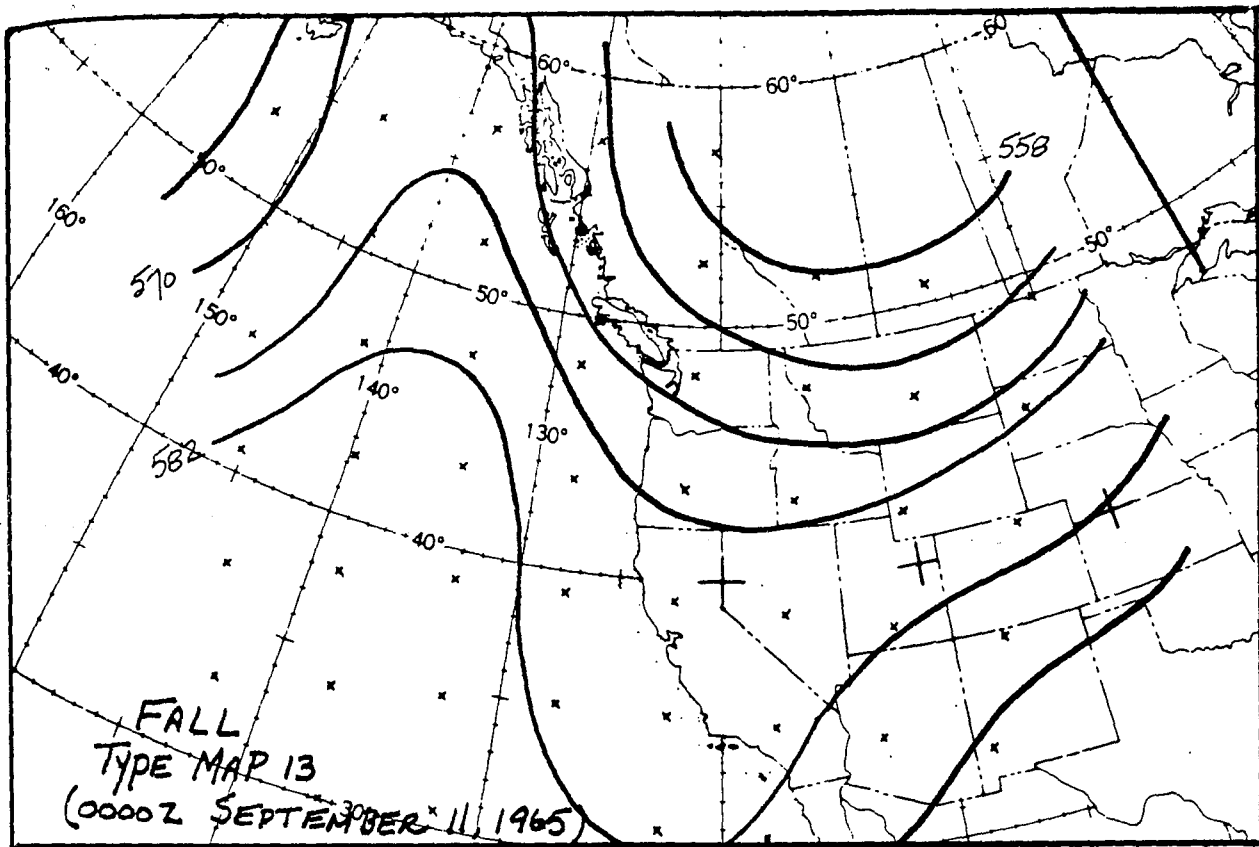


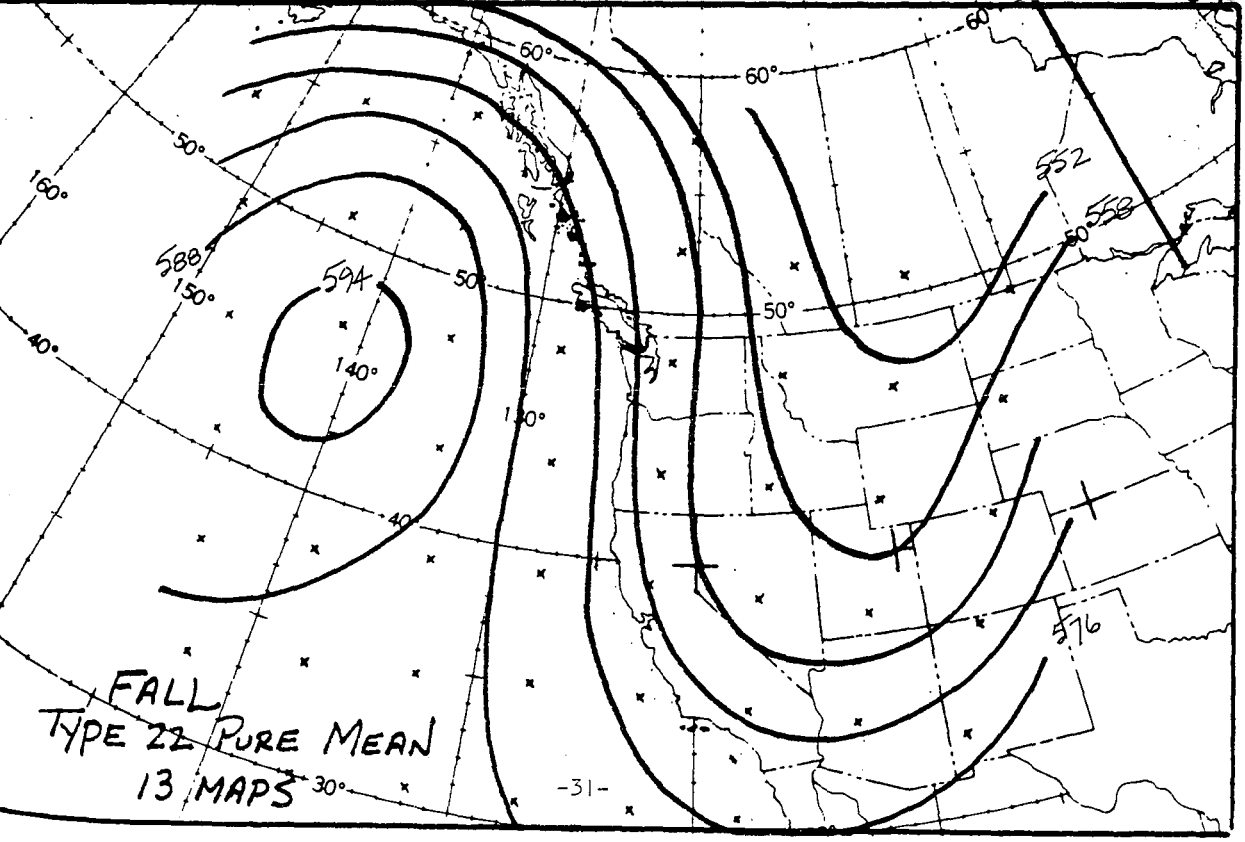
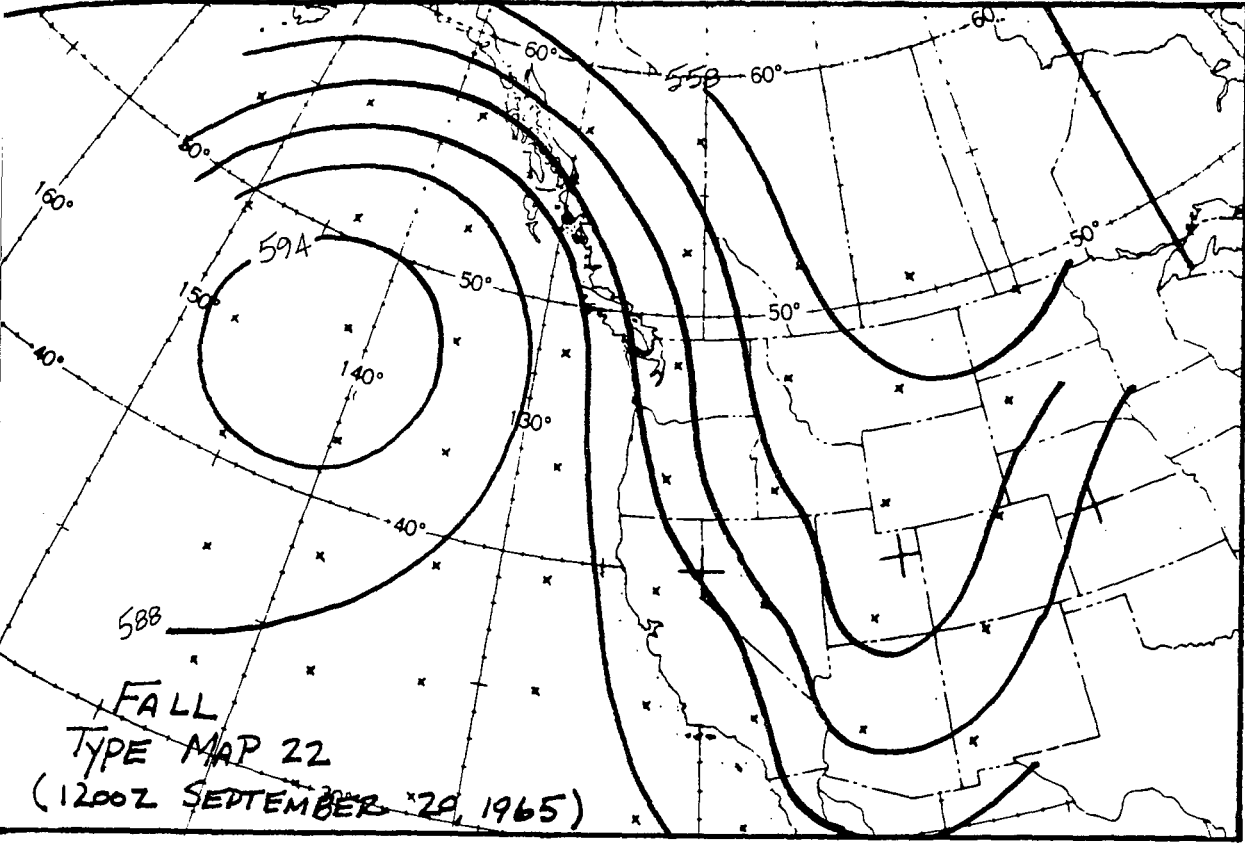


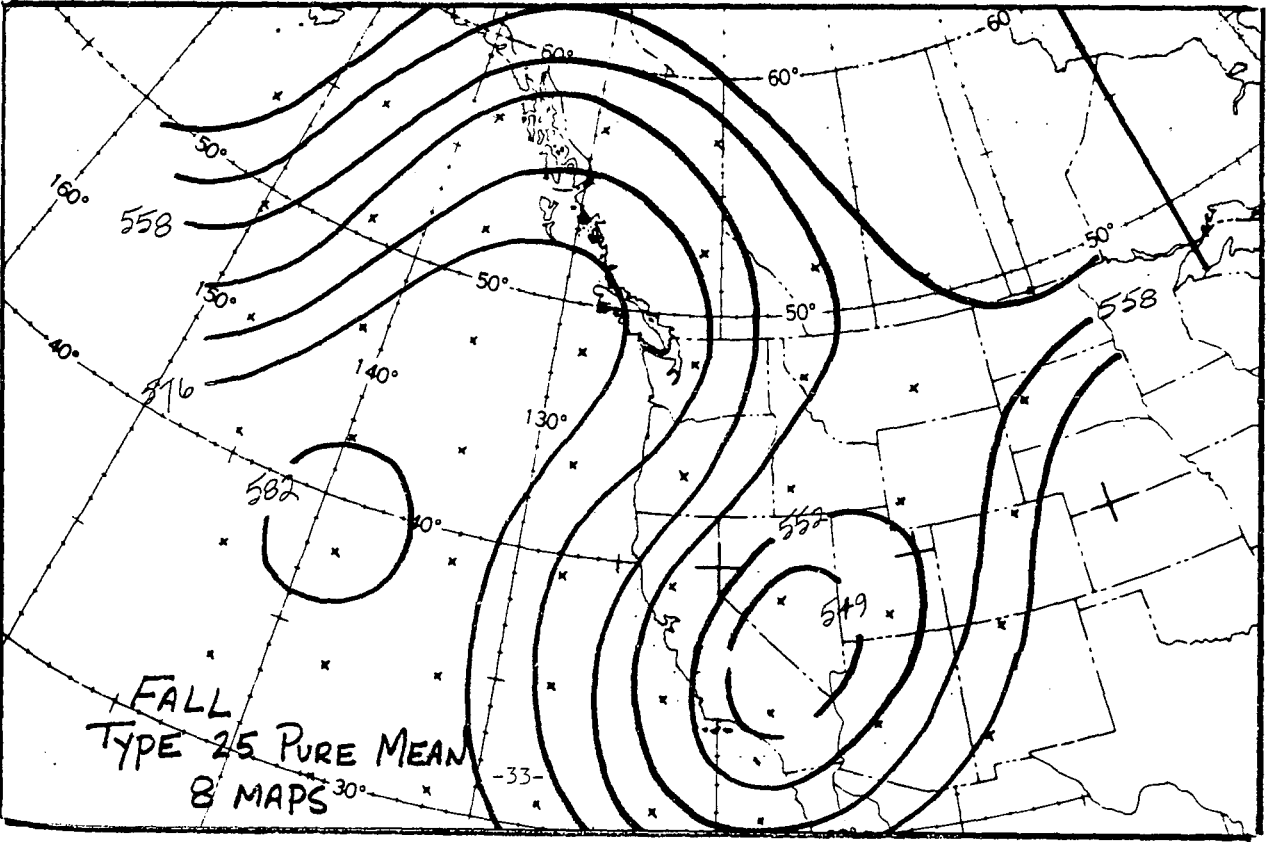
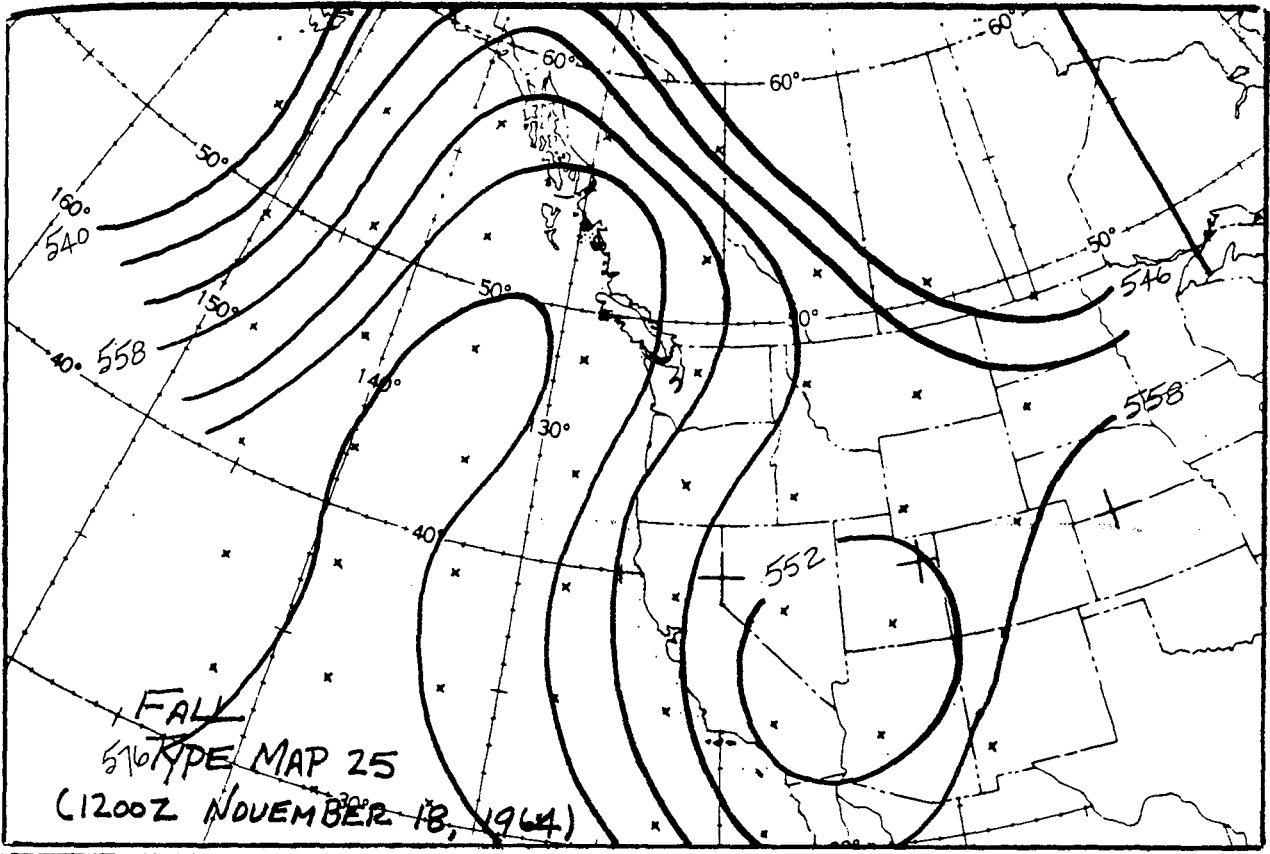
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500-MB FALL TYPE 7



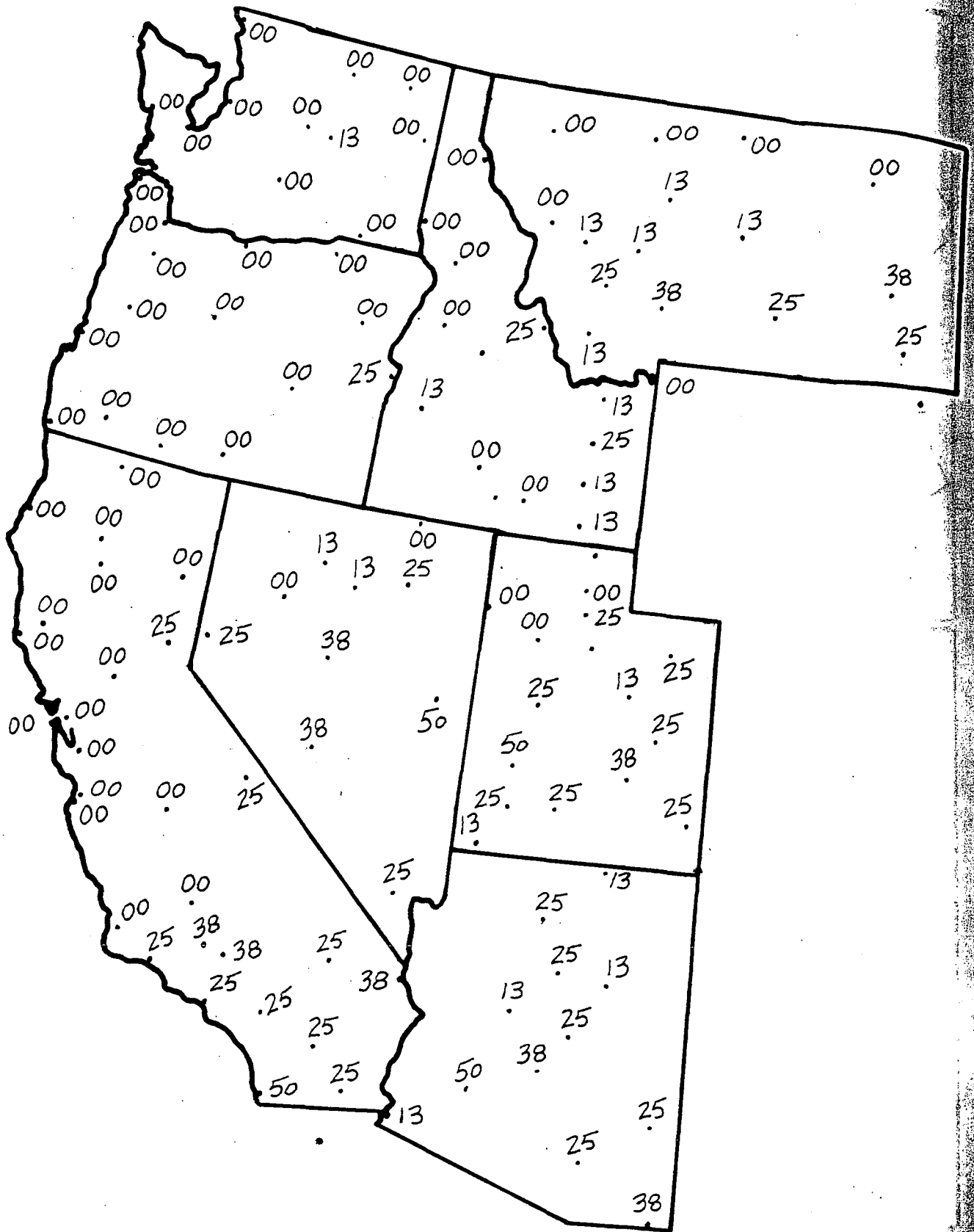


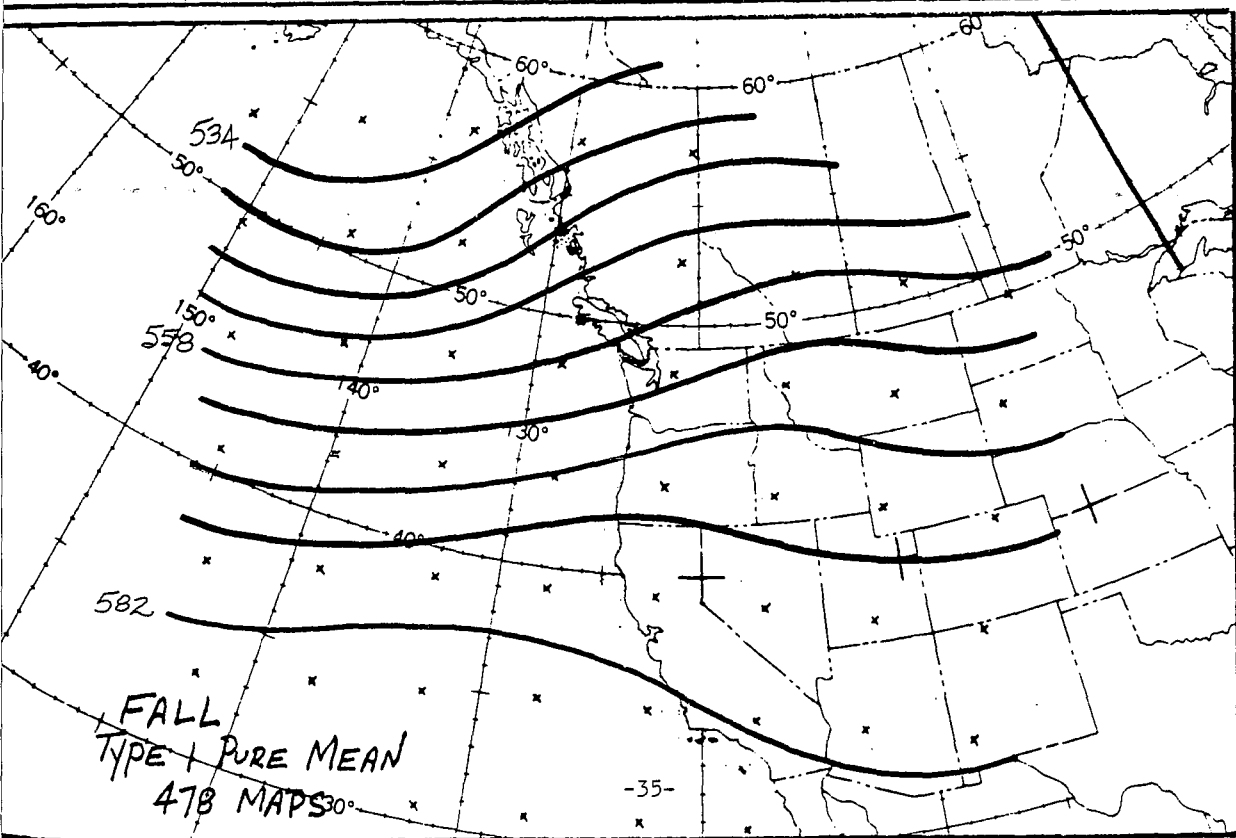
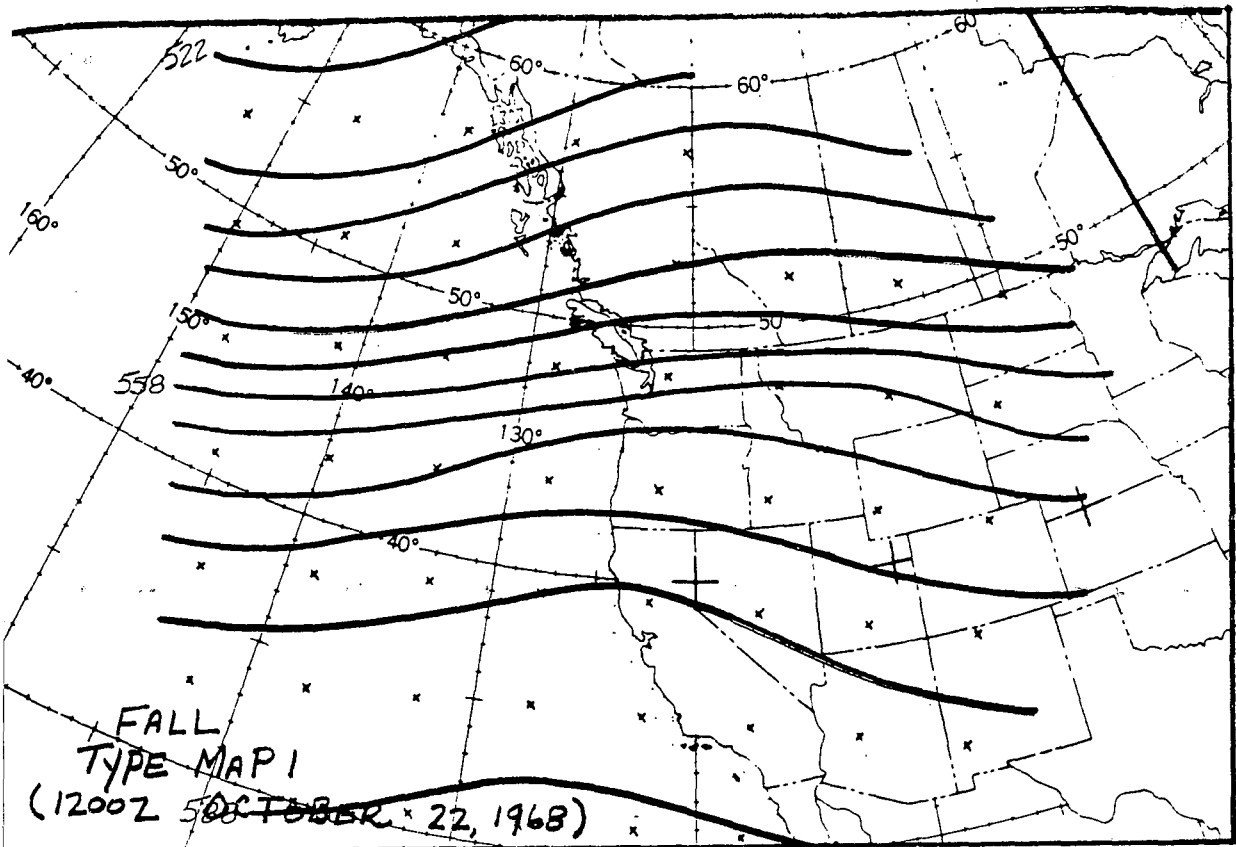




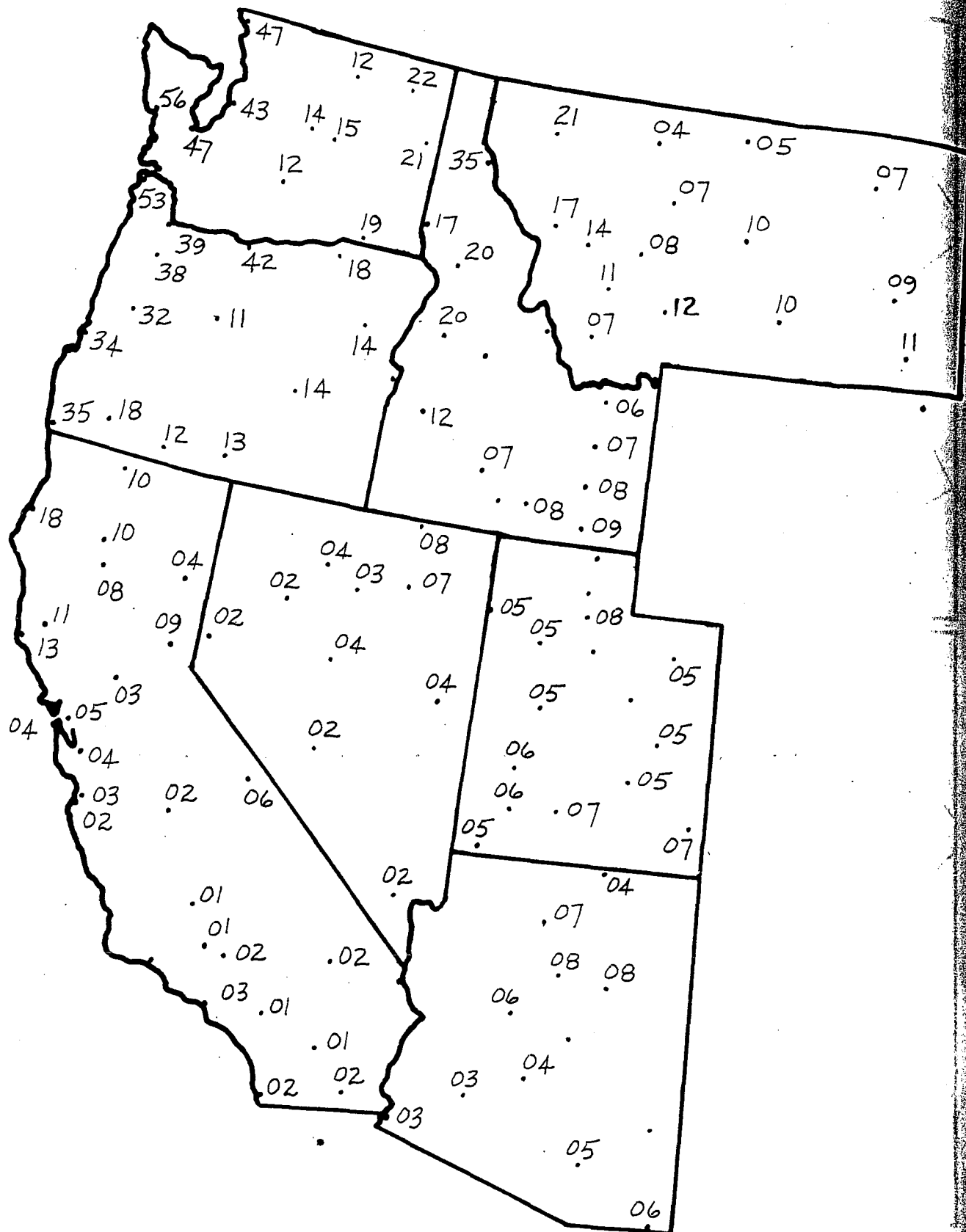


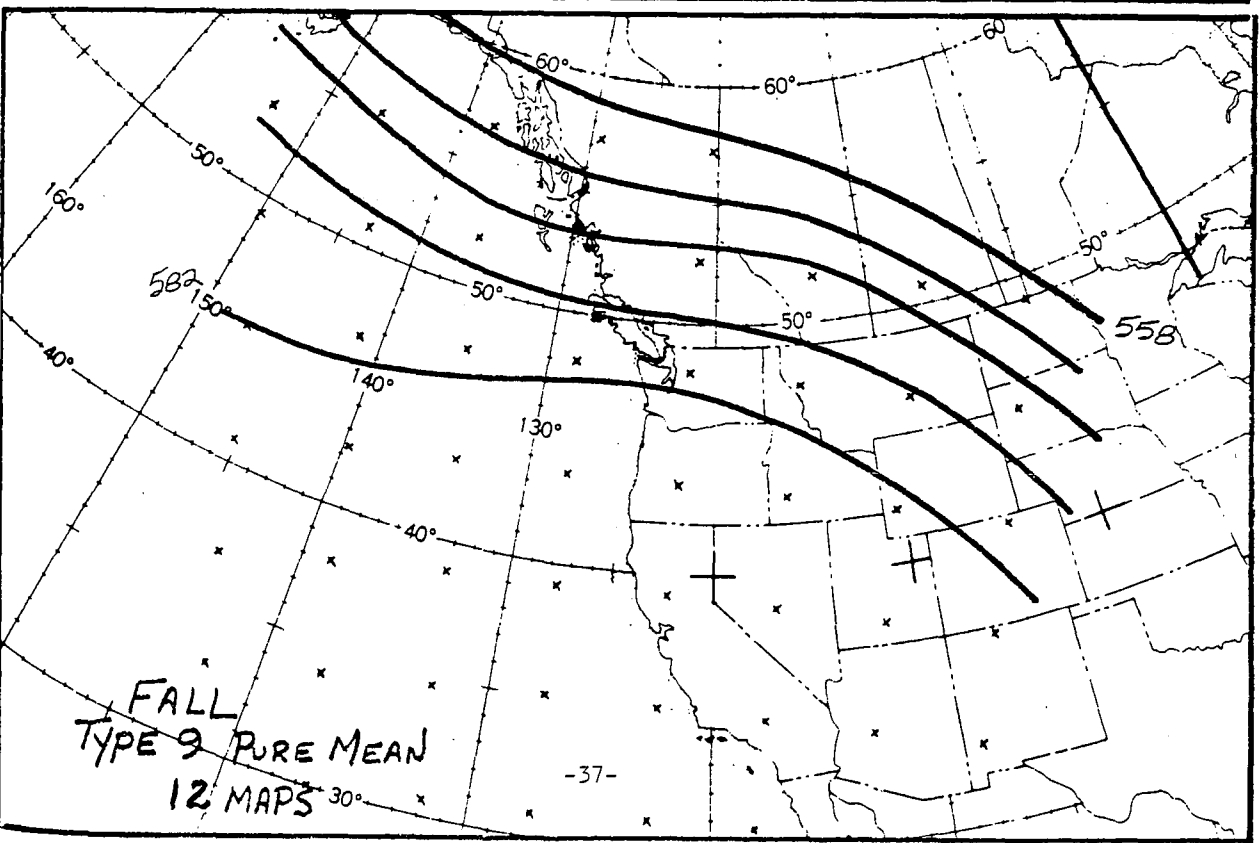
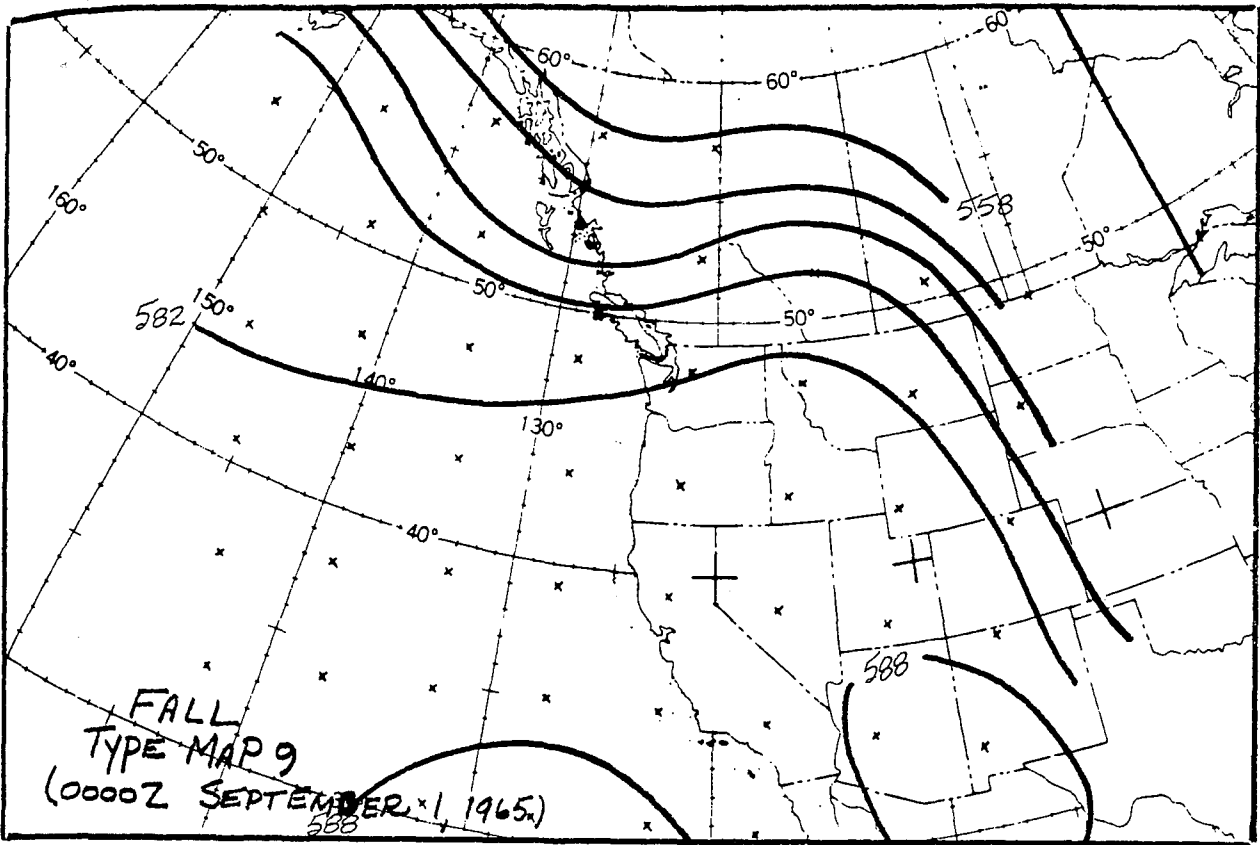
PERCENT FREQUENCY OF PRECIPITATION OCCURRENCE WITH
500-MB FALL TYPE 25



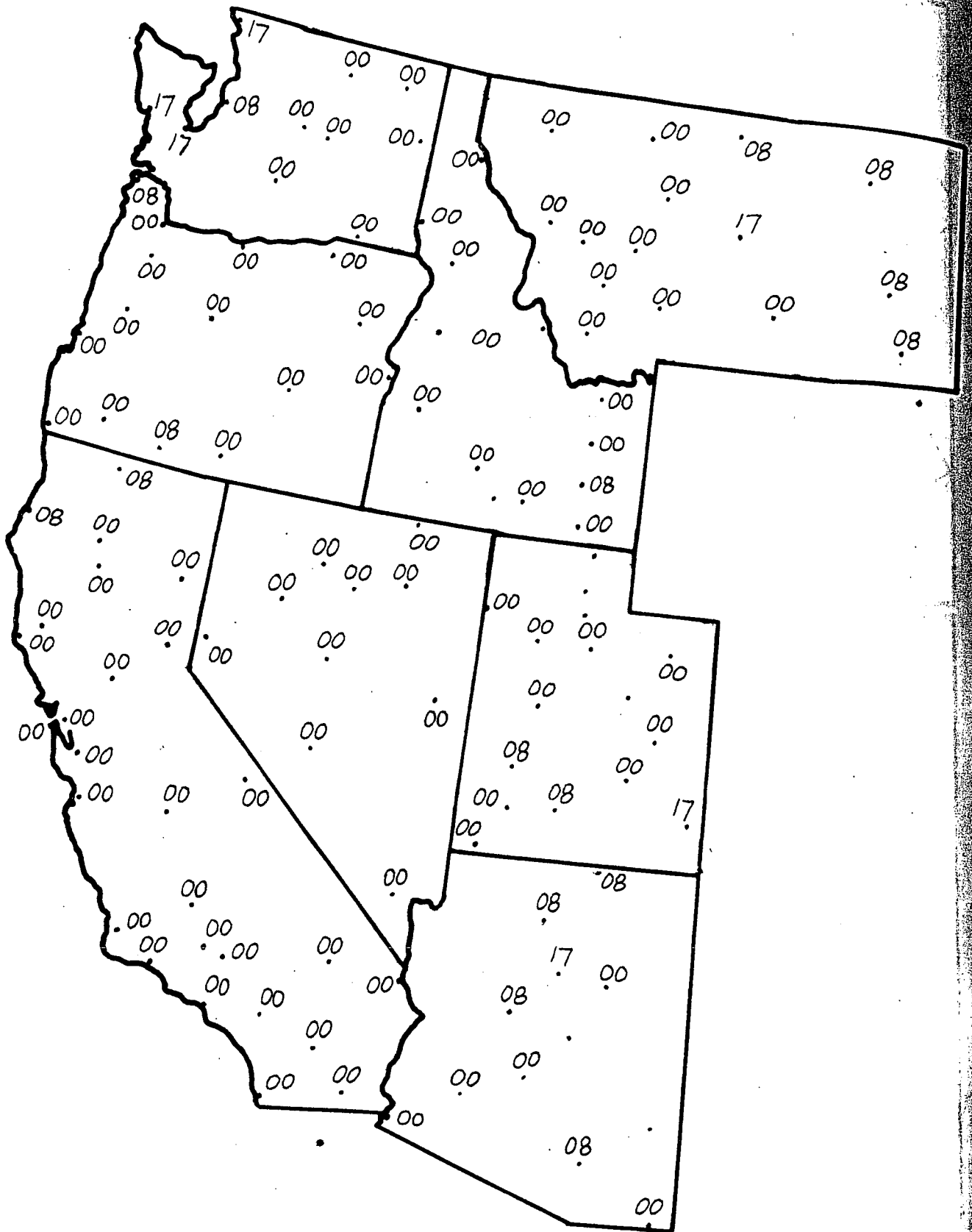


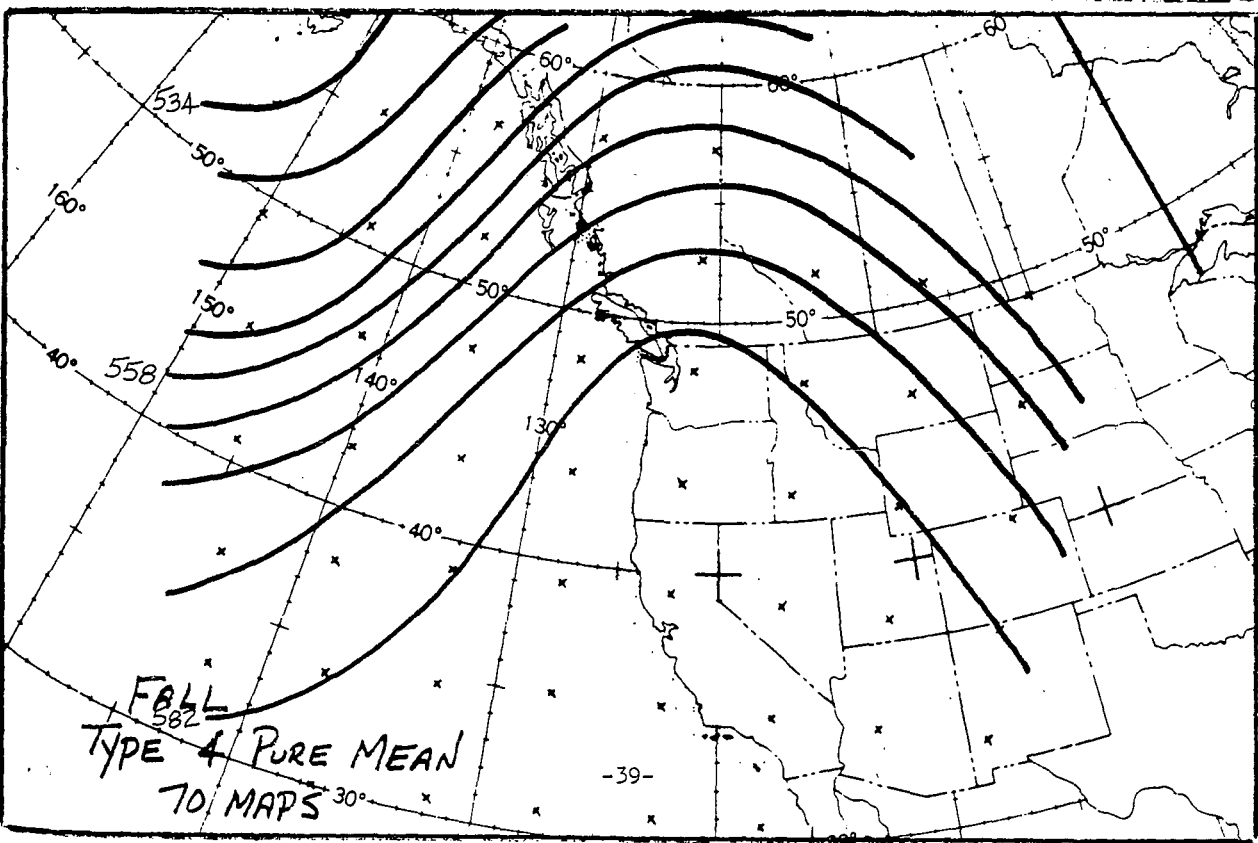
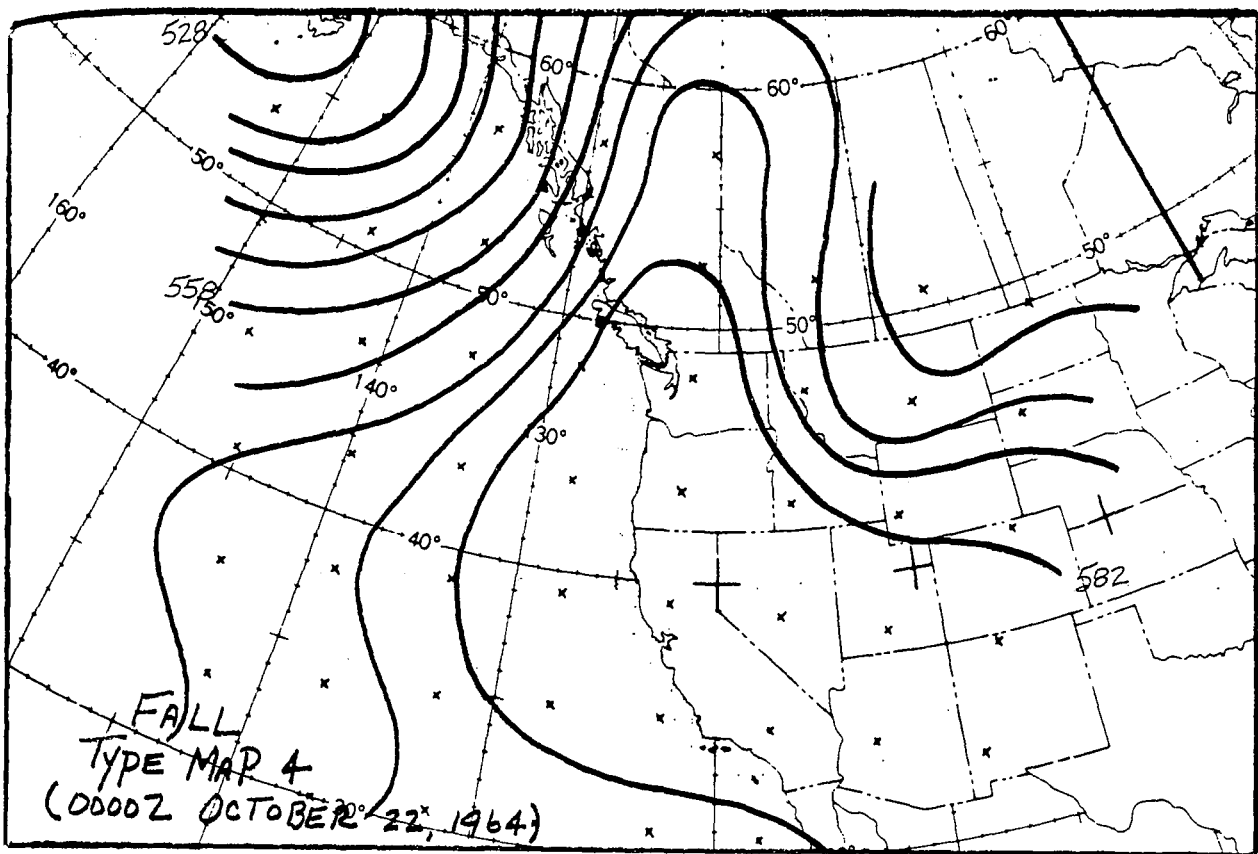
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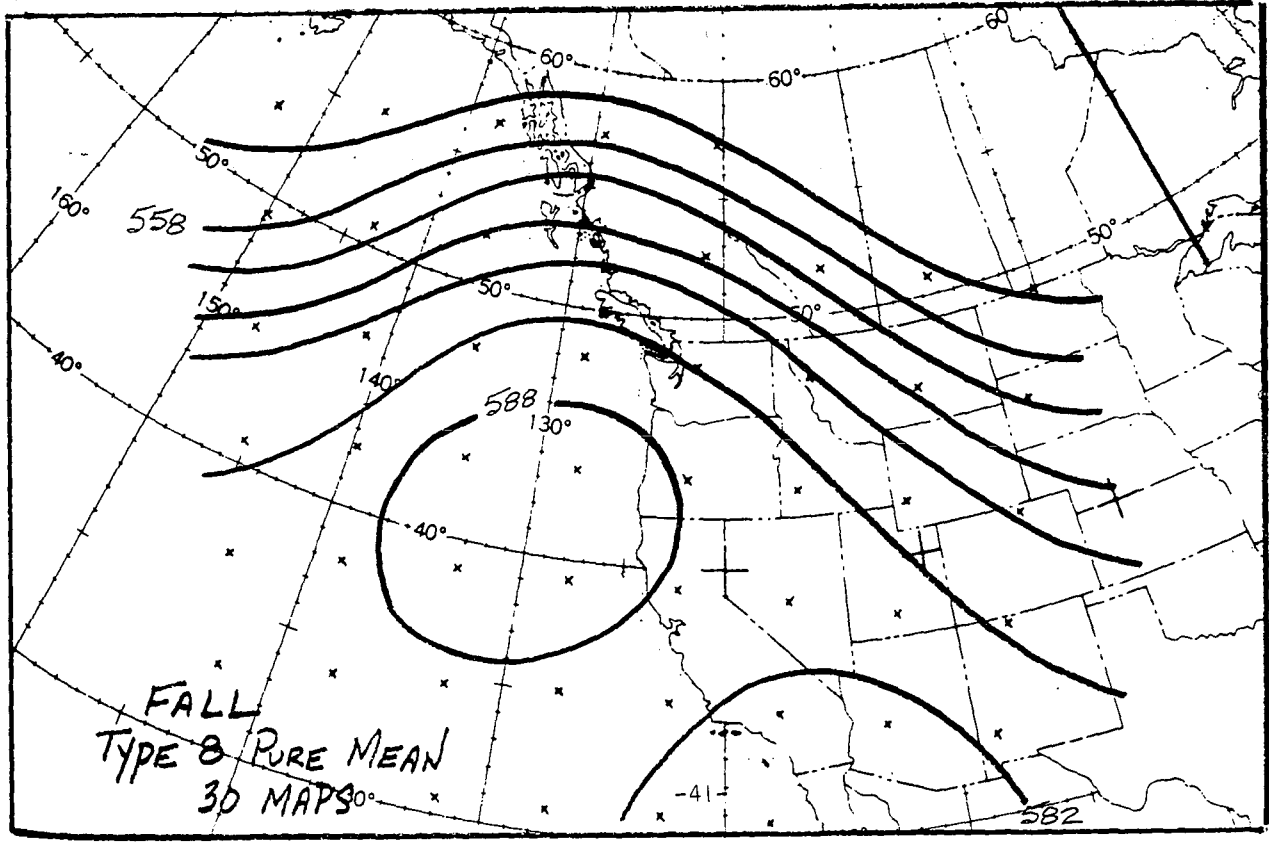
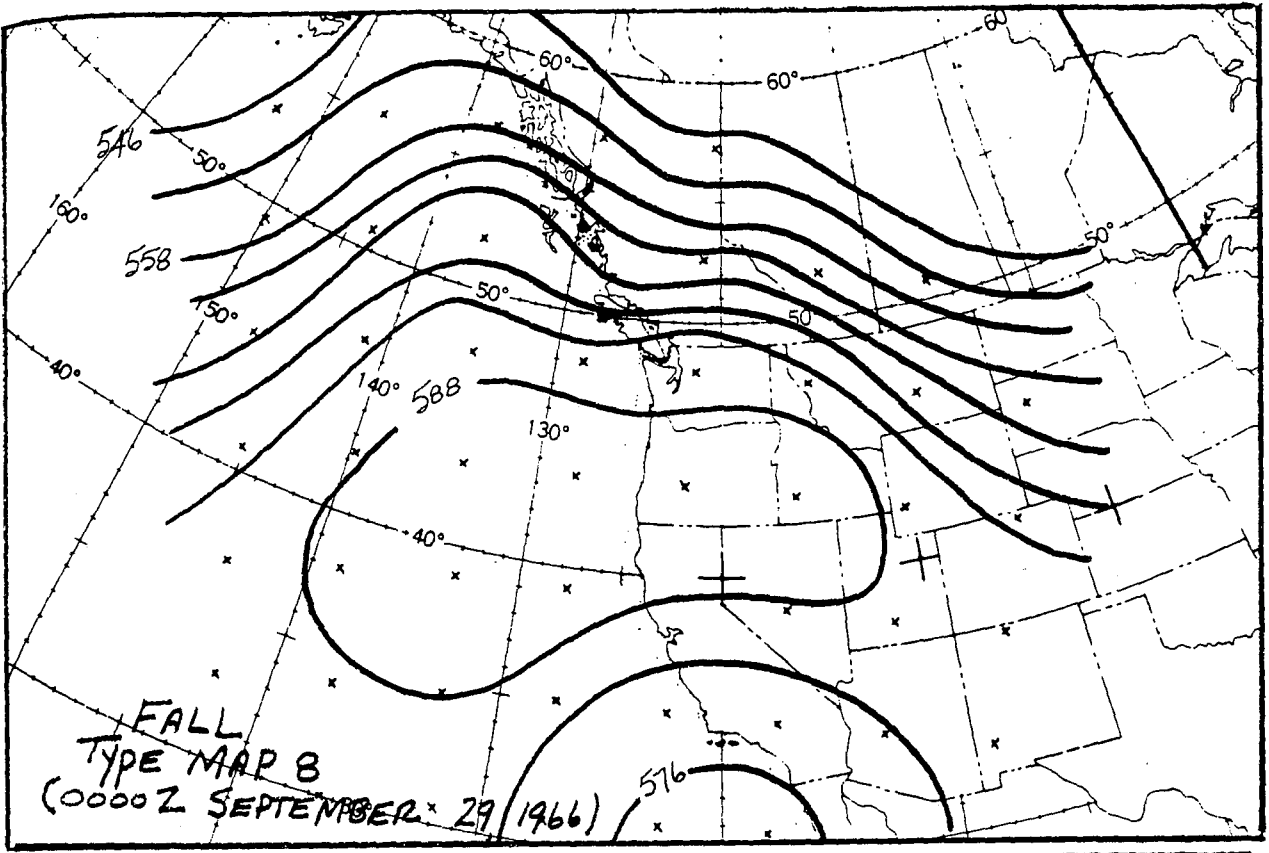


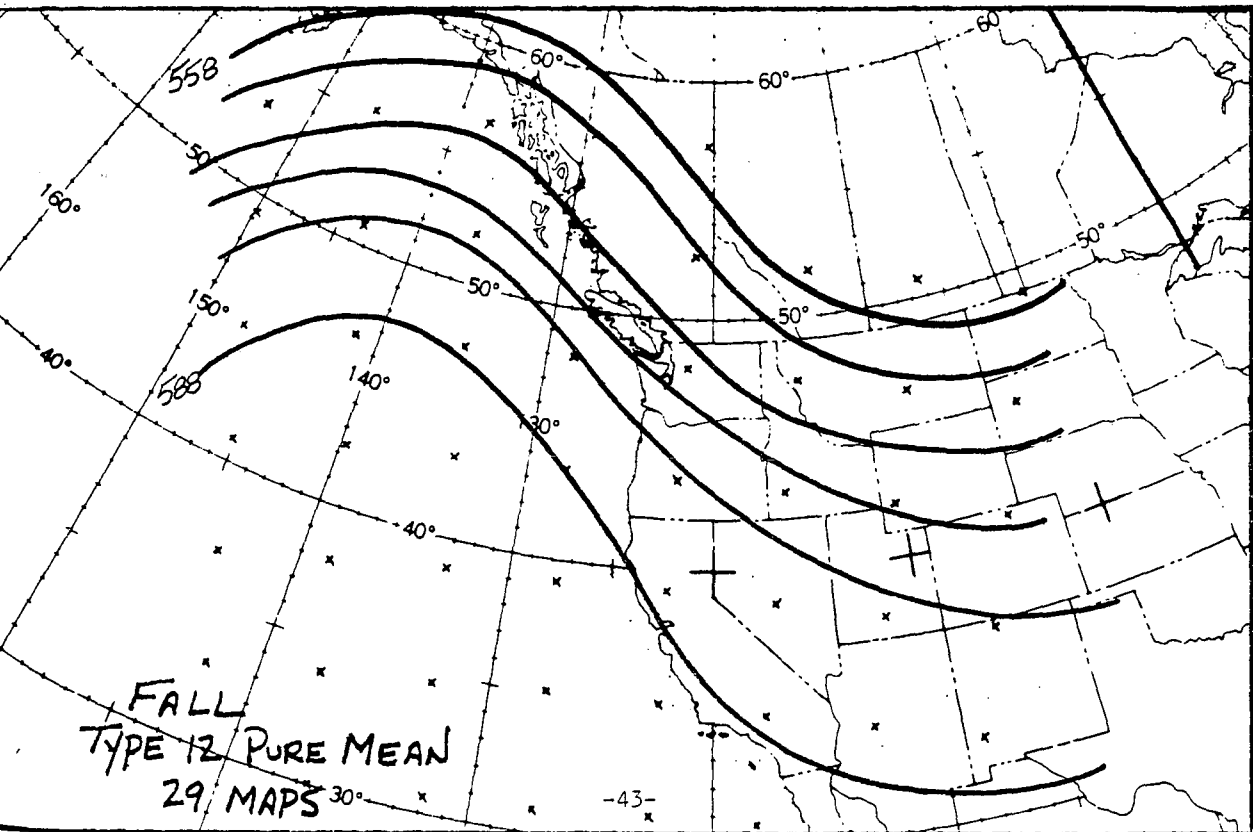
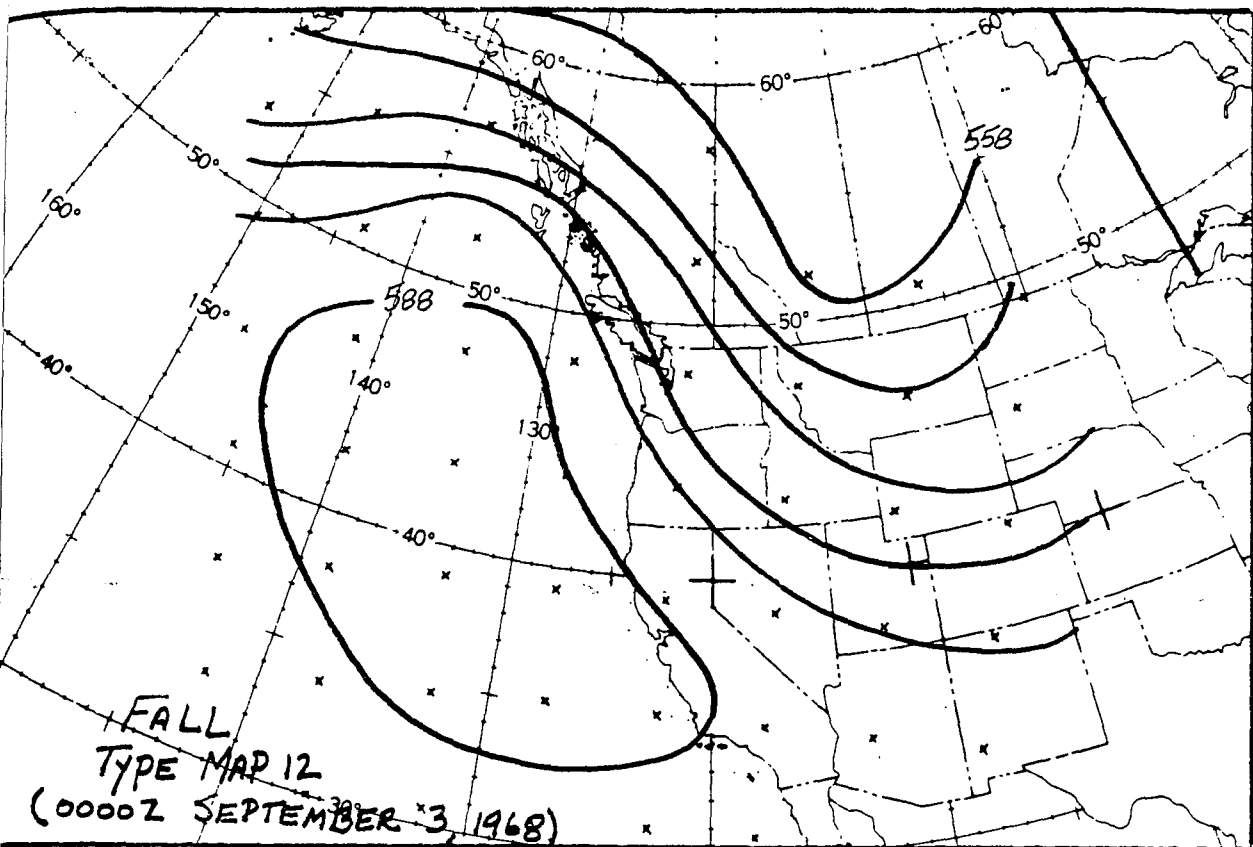


PERCENT FREQUENCY OF PRECIPITATION OCCURRENCE WITH
500-MB FALL TYPE 9

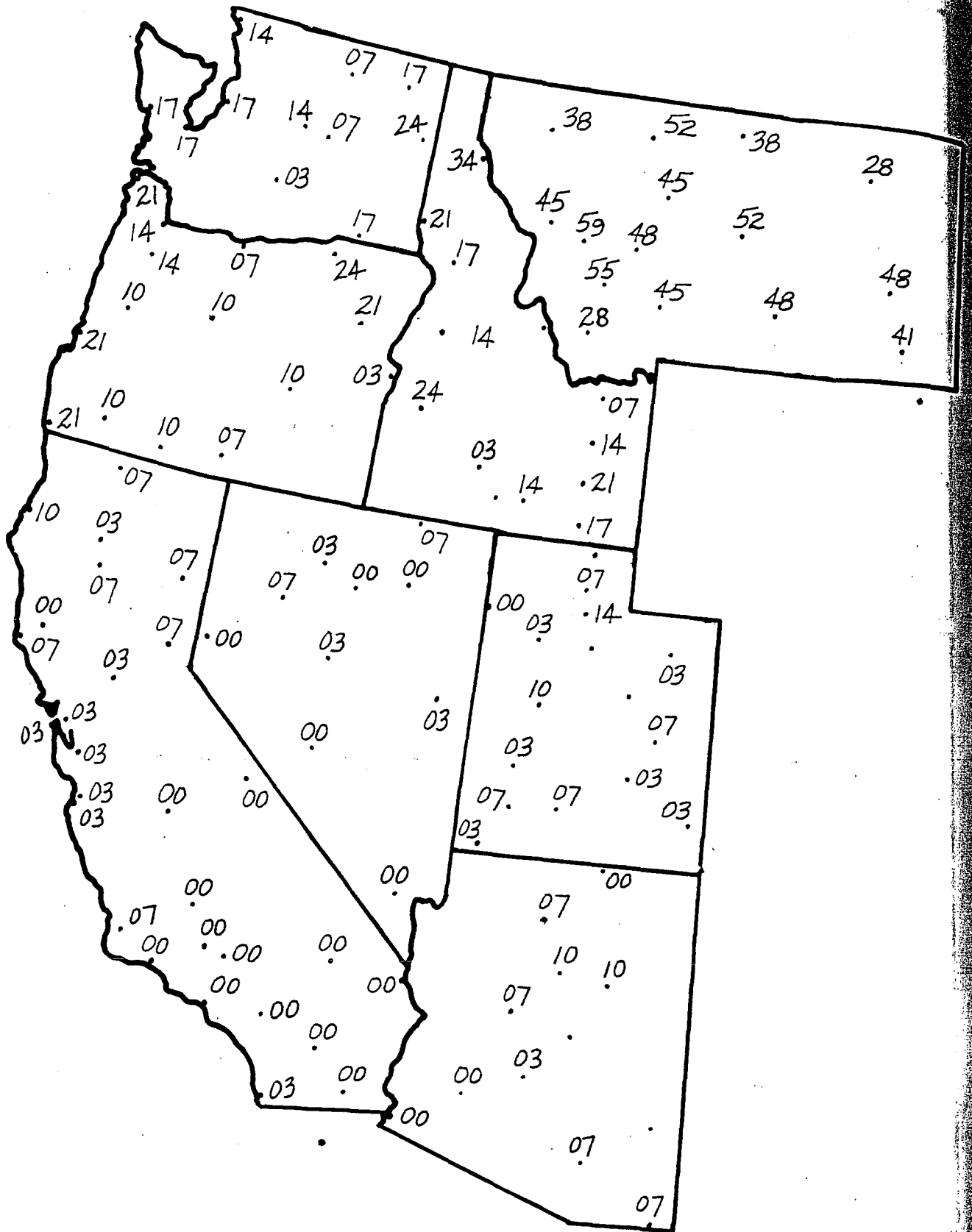


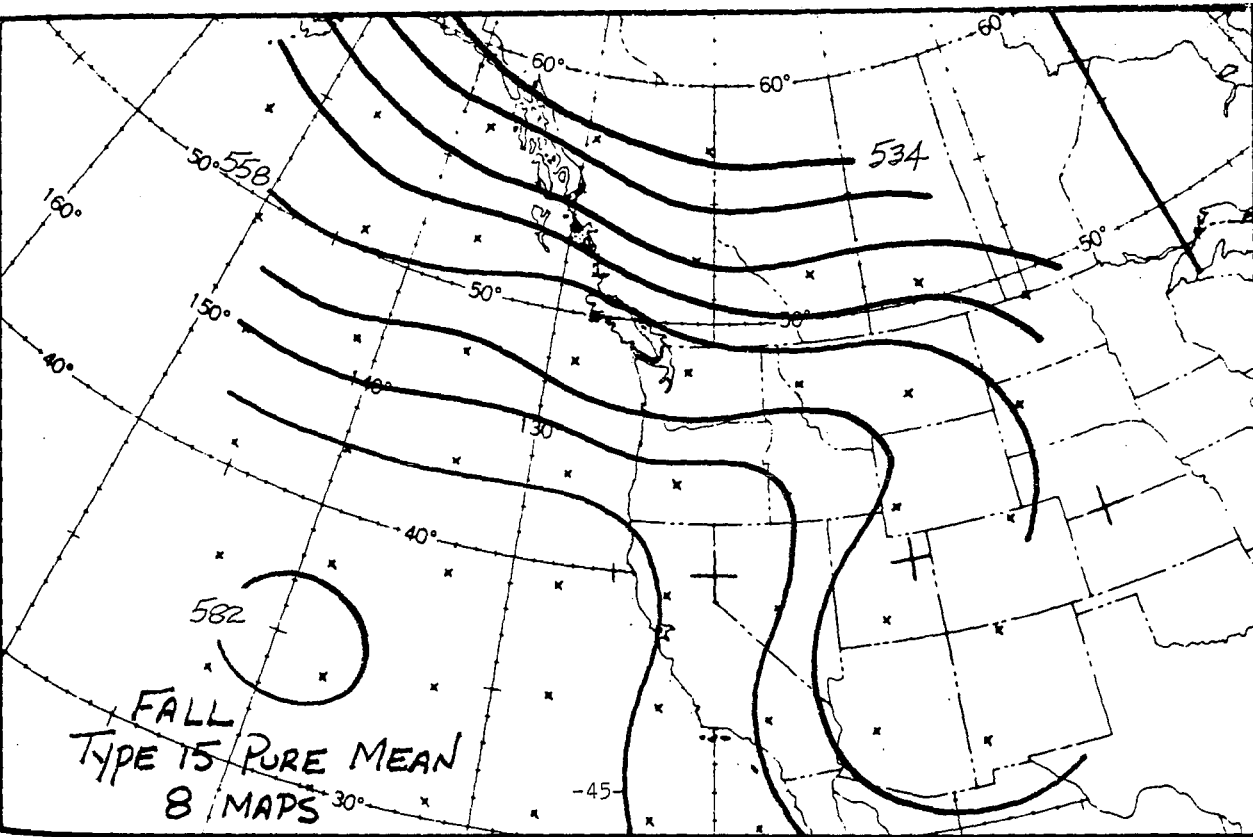
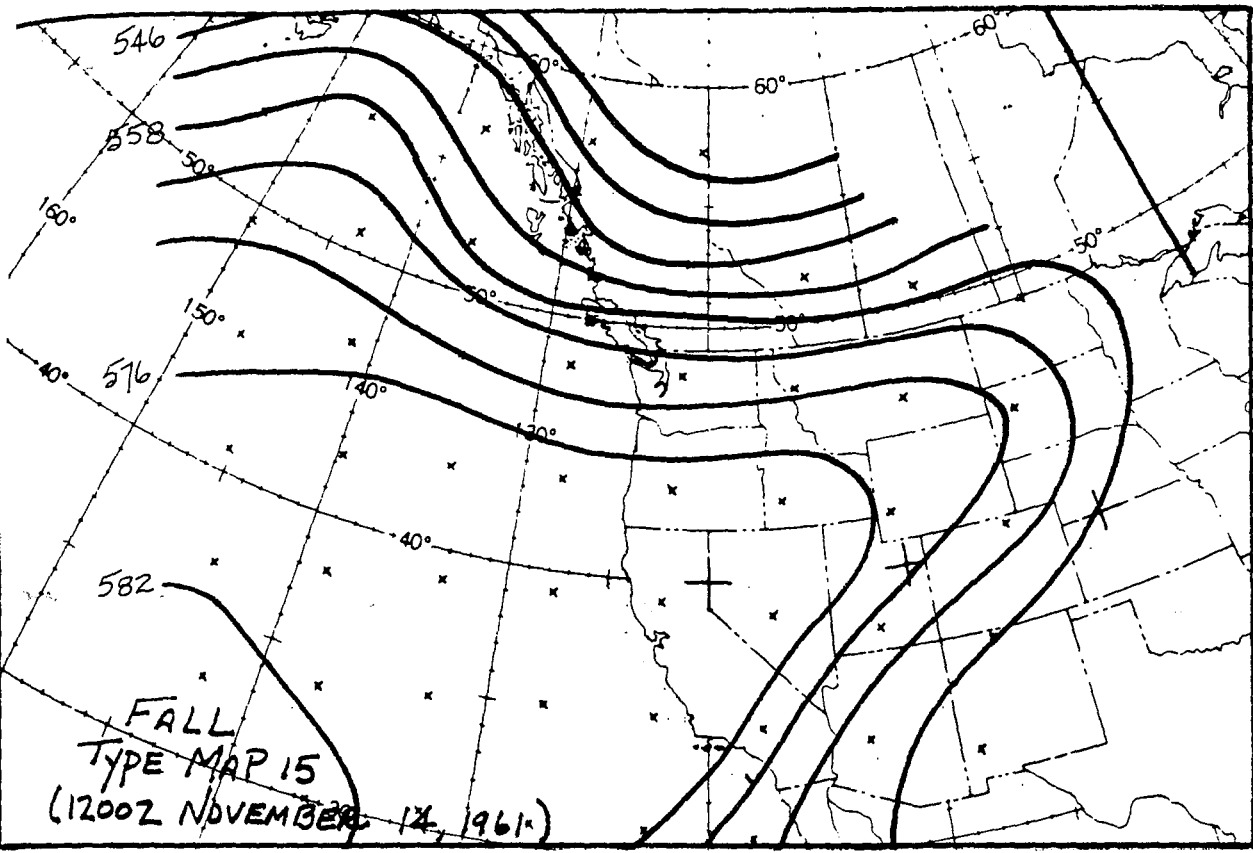




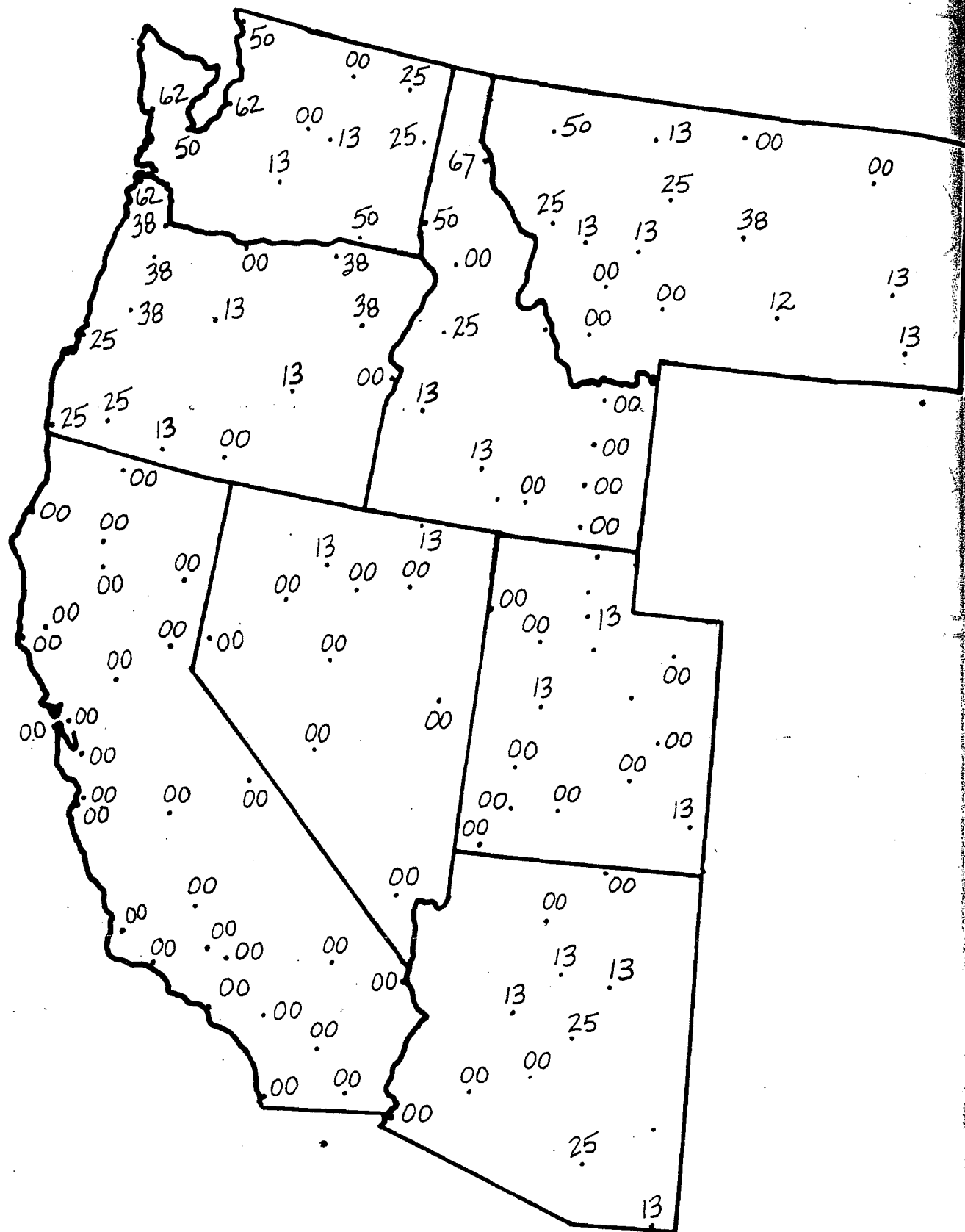


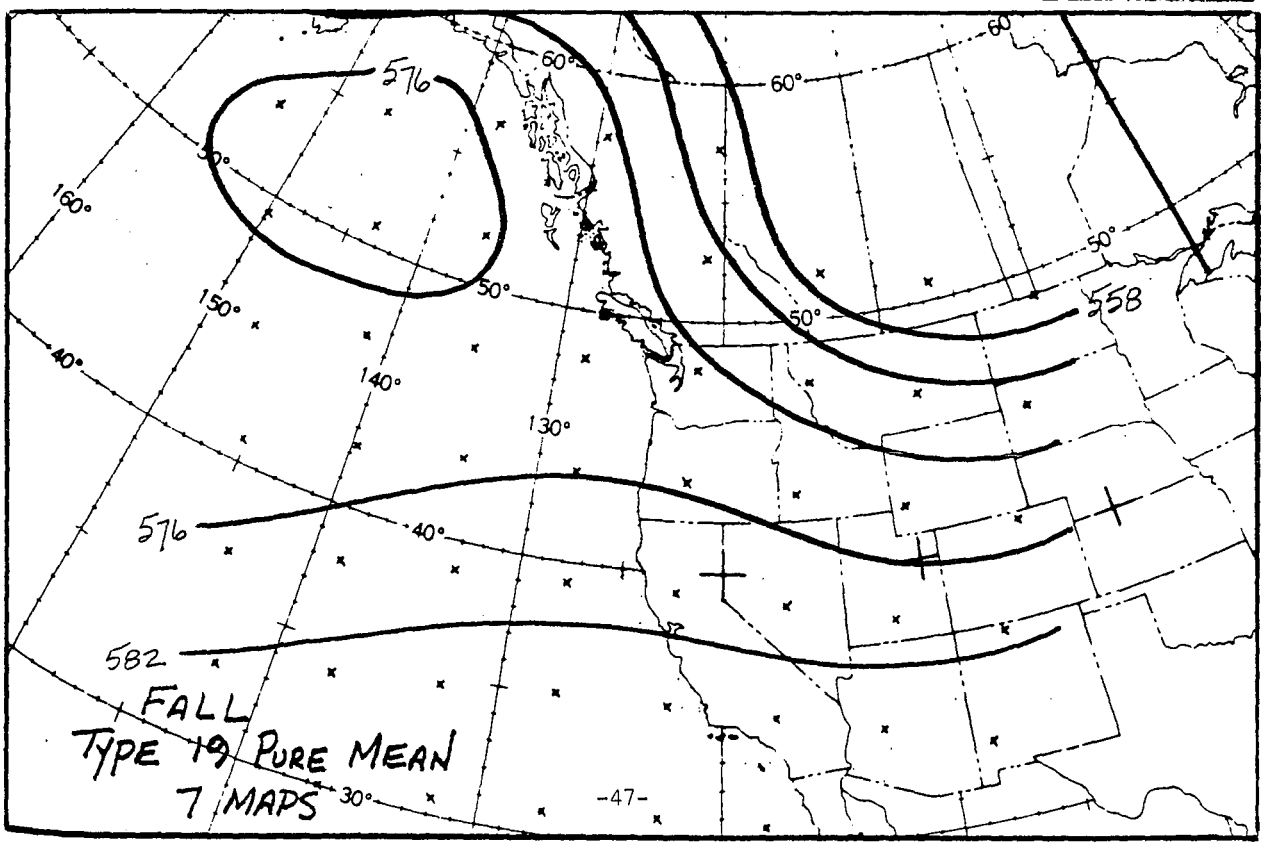
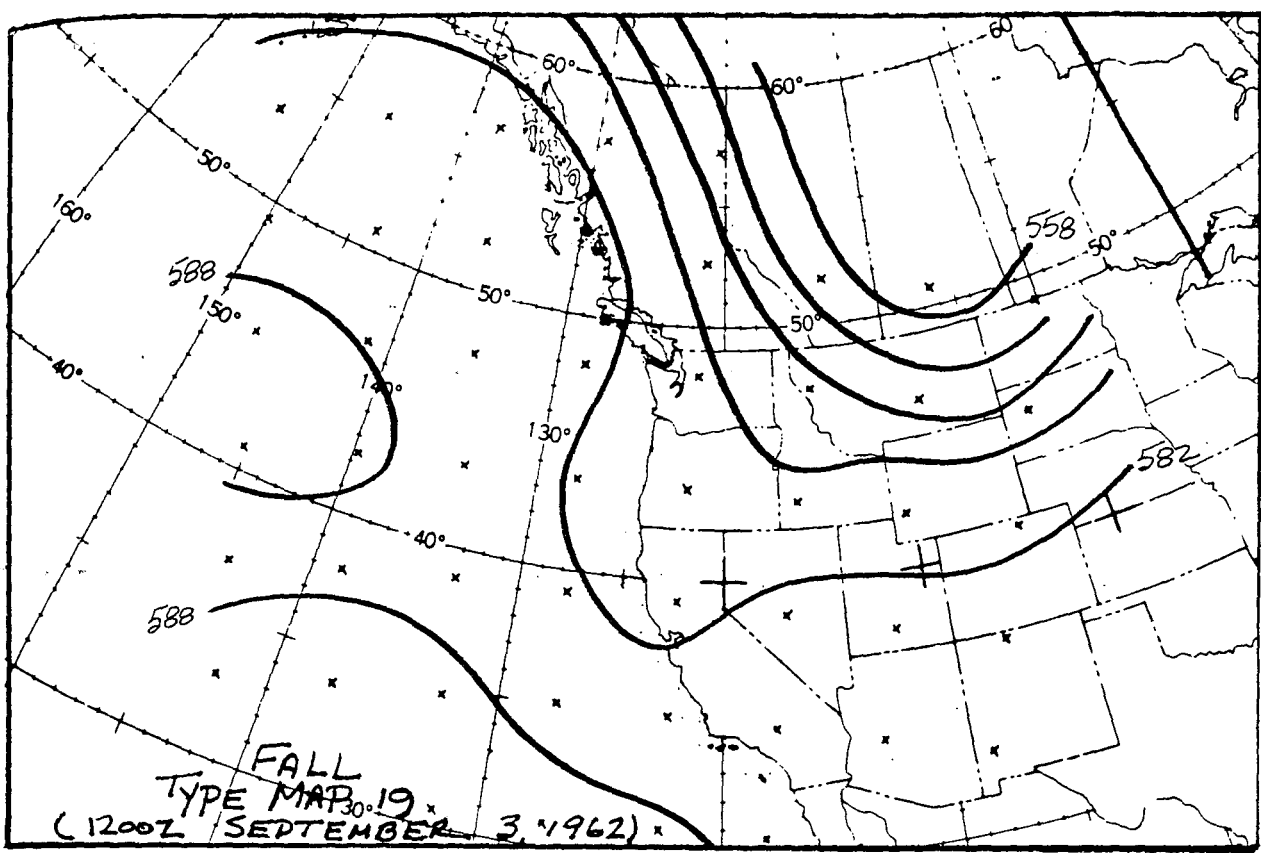
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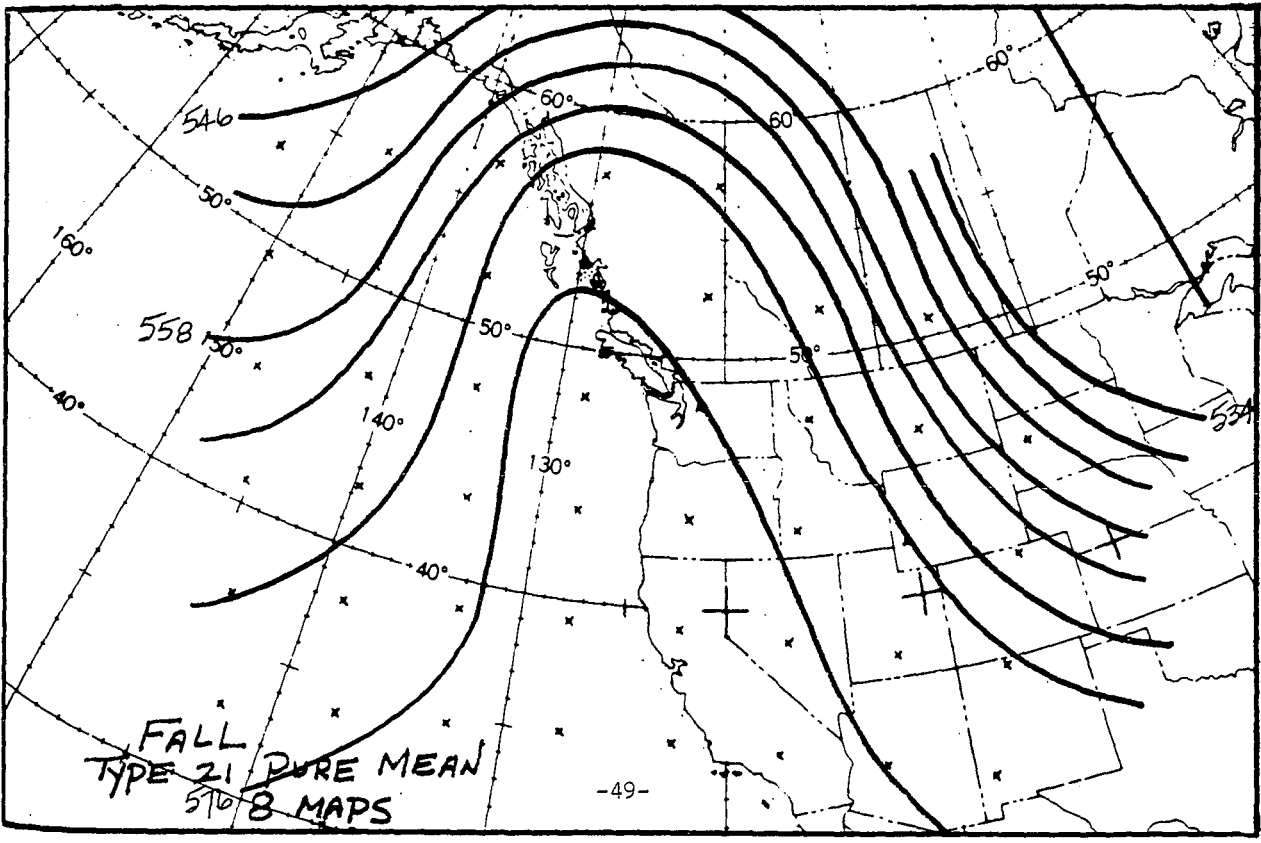
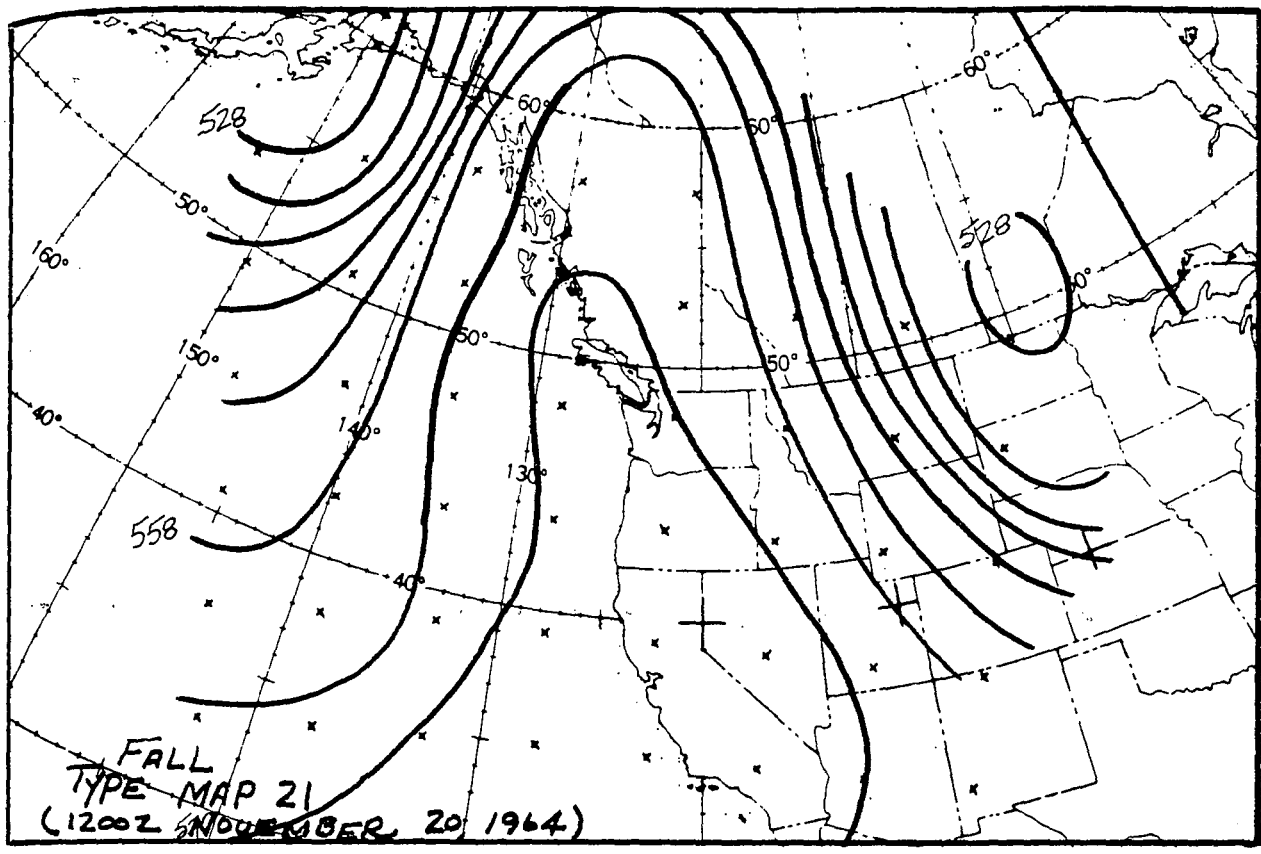




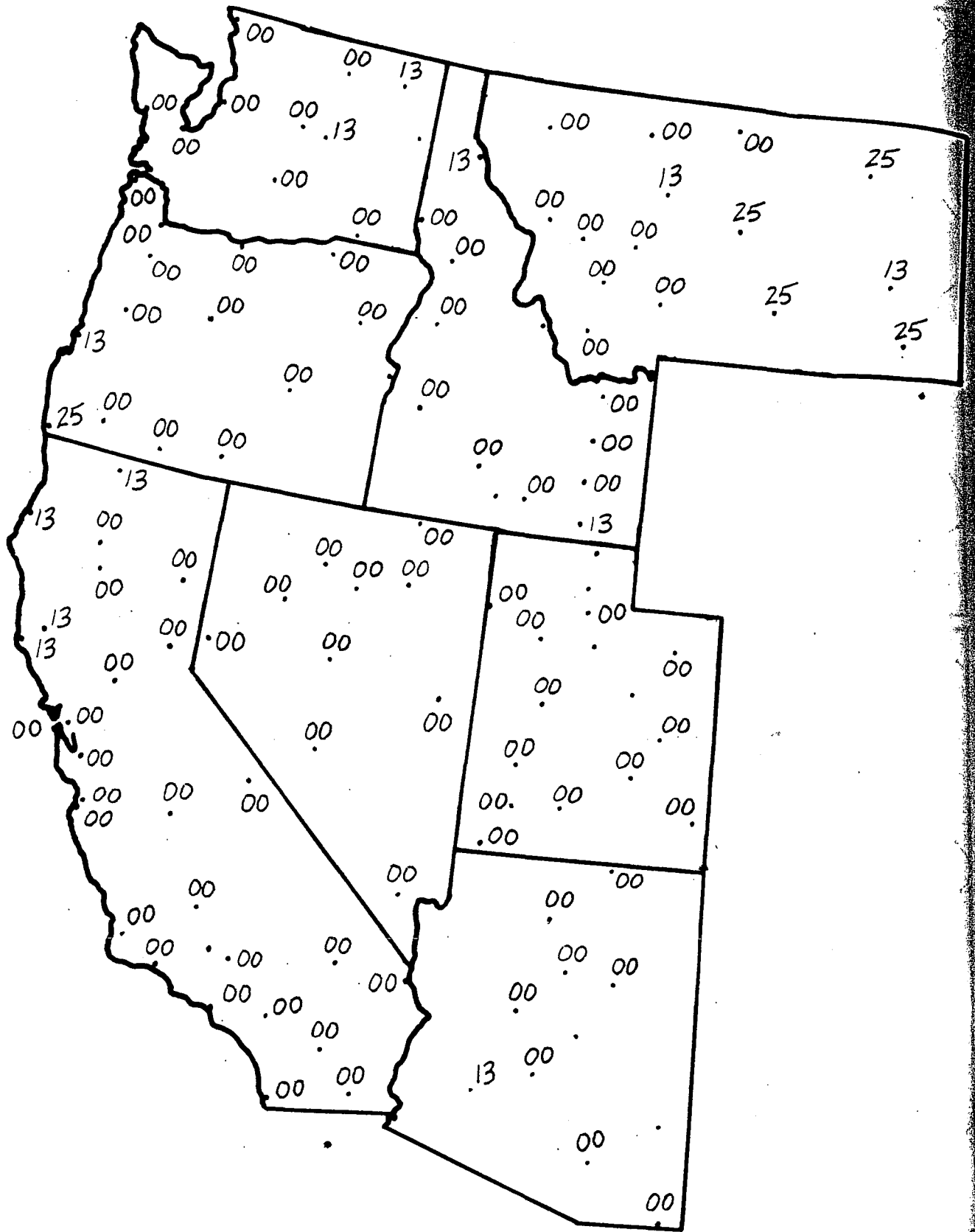
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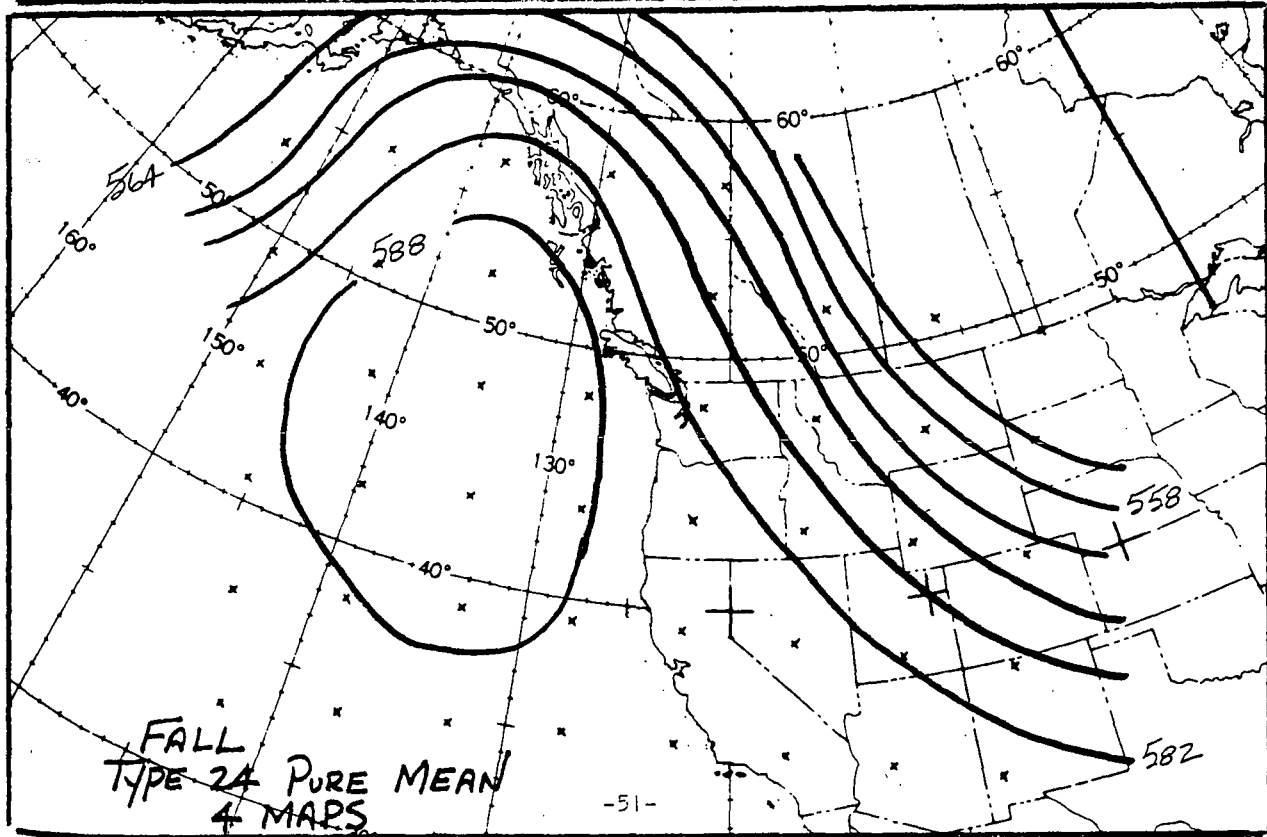
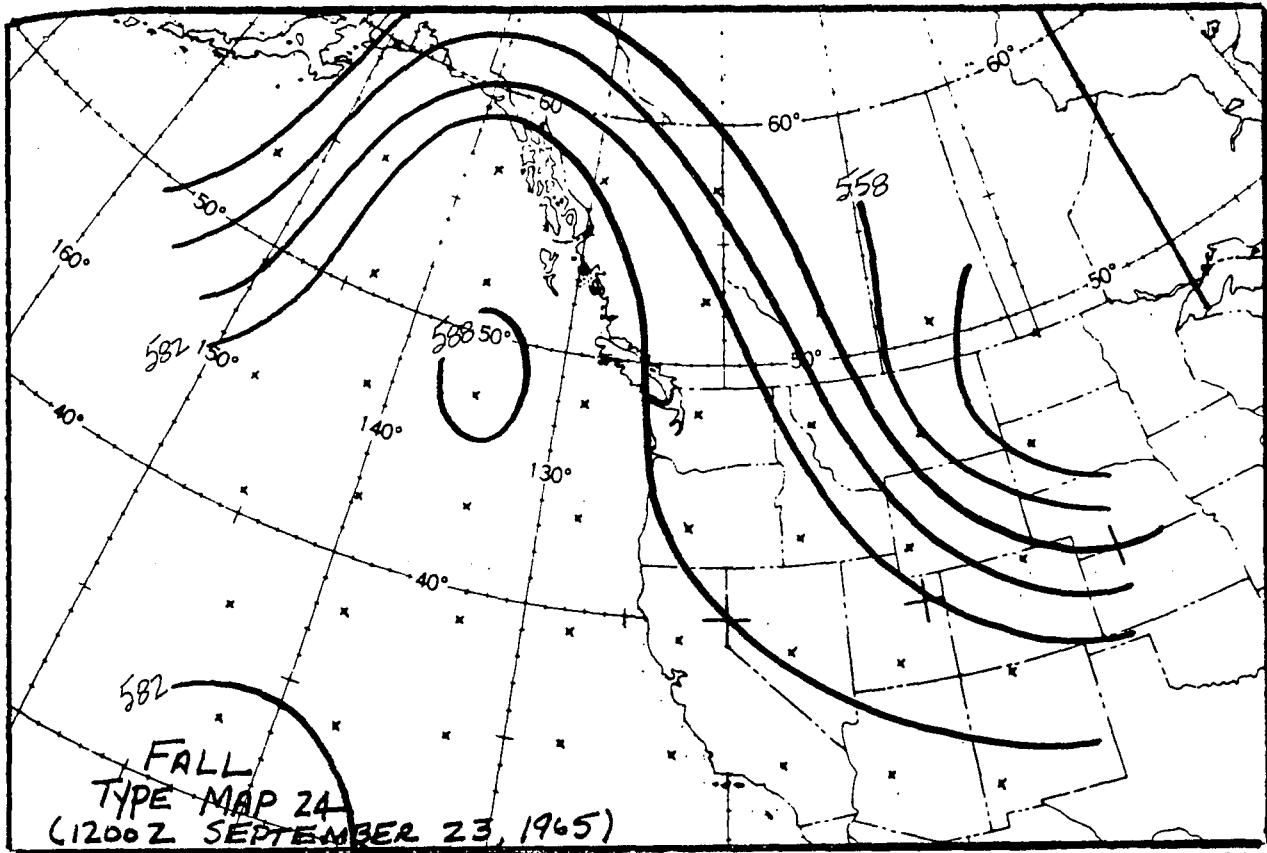




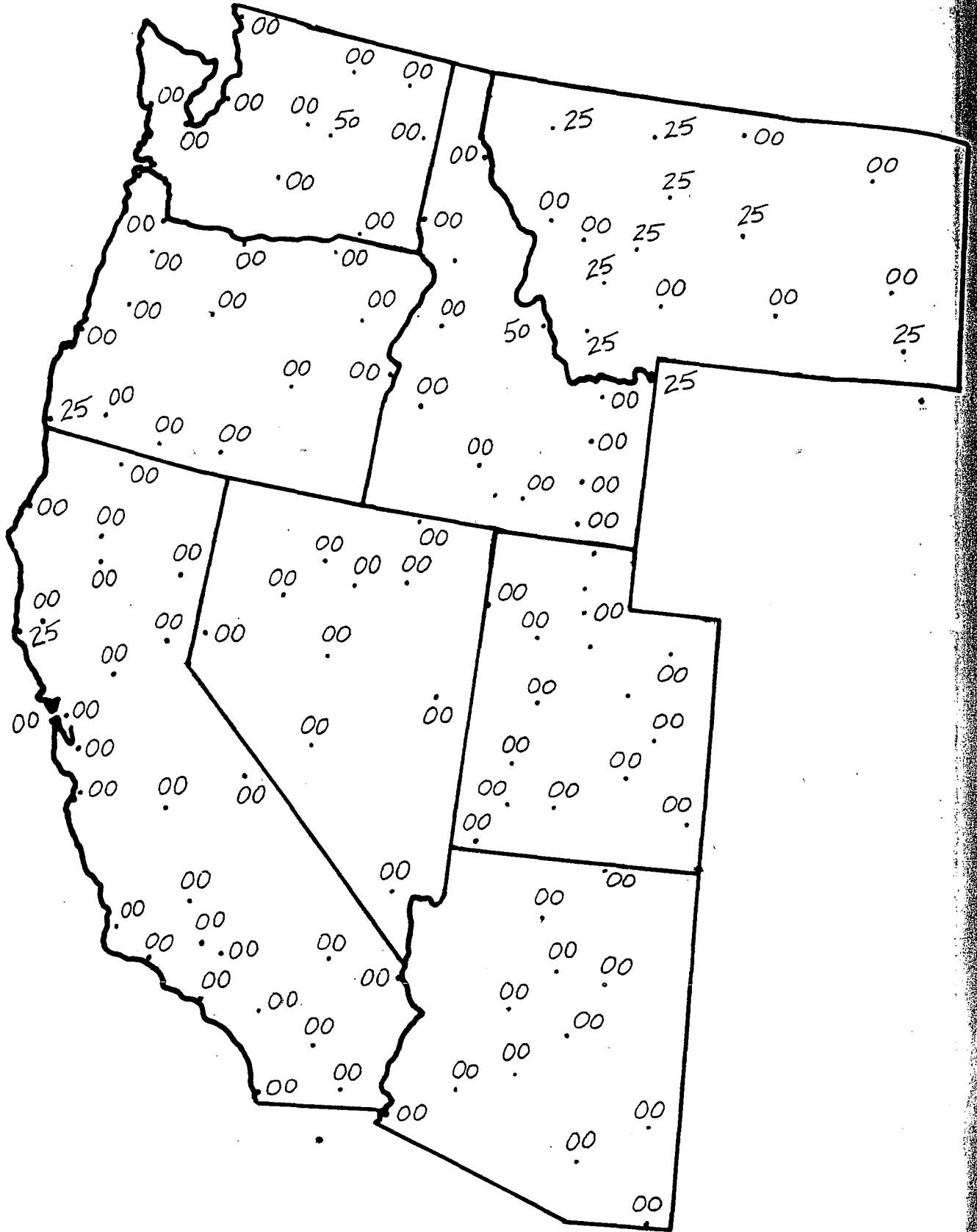


PERCENT FREQUENCY OF PRECIPITATION OCCURRENCE WITH
500-MB FALL TYPE 21





PERCENT FREQUENCY OF PRECIPITATION OCCURRENCE WITH
500-MB FALL TYPE 24



APPENDIX B

Listing of Maps Within Each Type

TYPE I

Sep 1961	Sep 1963	Sep 1964	Sep 1965	Sep 1966	Sep 1967	Sep 1968
9-12	1-0	11-12	30-12	3-12	1-12	7-0
12-12	1-12	12-12		4-0	2-0	7-12
13-0	2-0	13-0		5-0	2-12	8-0
13-12	2-12	13-12		5-12	3-0	8-12
14-0	13-12	14-0		6-0	3-12	9-0
14-12	14-0	14-12		15-12	4-0	9-12
15-0	21-0	15-0		16-0	7-0	11-12
15-12	21-12	15-12		16-12	7-12	12-0
16-12	22-0	16-0		17-0	8-0	12-12
17-12	23-0	16-12		17-12	8-12	13-0
19-12	23-12	17-0		18-0	9-0	13-12
21-12	24-12	28-0		25-12	9-12	14-0
22-0		28-12		26-0	10-0	14-12
22-12		29-0		26-12	10-12	15-0
27-0		29-12			11-0	18-0
27-12		30-0			12-0	23-12
28-0		30-12			12-12	24-0
28-12					21-0	24-12
29-0					21-12	25-0
29-12					22-0	25-12
30-0					22-12	26-0
30-12					23-0	26-12
					23-12	27-0
					24-12	
					25-0	
					25-12	
					28-12	
					29-12	
					30-0	

Type I (Continued)

Oct 1962	Oct 1963	Oct 1964	Oct 1965	Oct 1966	Oct 1967	Oct 1968
5-0	1-0	1-0	1-0	5-0	6-0	1-0
5-12	2-12	1-12	1-12	5-12	6-12	1-12
6-0	3-0	2-0	2-0	6-0	7-0	4-0
7-0	3-12	2-12	4-12	6-12	7-12	4-12
7-12	4-0	3-0	5-0	7-0	8-0	5-0
8-0	12-12	3-12	5-12	7-12	8-12	5-12
8-12	18-0	8-12	6-0	8-0	9-0	6-0
9-0	18-12	9-0	6-12	10-0	9-12	8-12
9-12	20-12	9-12	7-0	10-12	10-0	9-0
10-12	21-0	10-0	7-12	11-0	10-12	9-12
21-12	21-12	10-12	8-0	18-0	11-0	10-0
26-12	22-0	11-0	8-12	18-12	11-12	10-12
	22-12	11-12	9-0	19-0	12-0	11-0
	23-0	14-12	9-12	19-12	12-12	16-12
	23-12	15-0	10-0	20-0	13-0	17-0
	24-0	16-0	10-12	22-0	13-12	17-12
	24-12	16-12	11-12	22-12	14-0	18-0
	25-0	17-0	12-0	23-0	14-12	18-12
	25-12	17-12	12-12	23-12	15-0	19-0
	26-12	18-0	13-0	24-0	15-12	19-12
	27-0	23-12	13-12	24-12	16-0	20-0
	27-12	24-0	14-0	25-0	16-12	20-12
	28-0	24-12	14-12	25-12	17-0	21-0
	28-12	25-0	17-0	26-0	17-12	21-12
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	30-12	31-12	19-0	28-0	19-12	23-12
	31-0		19-12	28-12	20-0	24-0
	31-12		20-0	29-0	20-12	24-12
			20-12	29-12	21-0	25-0
			21-0	30-0	21-12	25-12
			28-12	30-12	22-0	26-0
			29-0	31-0	22-12	26-12
			29-12		23-0	27-0
			30-0		23-12	27-12
			30-12		24-0	30-12
			31-0		24-12	31-0
			31-12		25-0	31-12
					25-12	
					26-0	
					26-12	
					27-0	
					27-12	
					28-0	
					28-12	
					30-12	
					31-0	
					31-12	

Type I (Continued)

Nov 1961	Nov 1962	Nov 1963	Nov 1964	Nov 1965	Nov 1966
3-12	4-12	1-0	1-0	1-0	2-0
5-12	5-0	1-12	1-12	1-12	2-12
6-0	5-12	2-0	2-0	2-0	11-12
8-12	6-0	2-12	2-12	2-12	12-0
9-0	7-12	3-0	3-0	3-0	12-12
9-12	8-0	3-12	3-12	3-12	13-0
10-0	8-12	4-0	4-0	4-0	13-12
10-12	9-0	4-12	4-12	4-12	26-12
11-0	10-12	5-0	9-12	5-0	27-0
11-12	11-0	5-12	11-12	5-12	27-12
17-12	11-12	7-0	12-0	21-12	
18-0	12-0	7-12	22-12	27-0	
18-12	14-12	8-12	23-0	27-12	
22-12	15-0	9-0	23-12	28-0	
23-0	20-0	9-12	24-0	28-12	
23-12	20-12	10-0	24-12	29-0	
	21-0	10-12	28-12	29-12	
	21-12	22-12	29-0	30-0	
	22-0	23-0	29-12	30-12	
	22-12	23-12	30-0		
	23-0	26-0	30-12		
	23-12	26-12			
	24-0	27-0			
	24-12	27-12			
	25-0	28-0			
	25-12	28-12			
	26-0	29-0			
	26-12	30-0			
	27-0	30-12			
	28-0				
	28-12				
	29-0				
	29-12				
	30-0				
	30-12				

TYPE 2

Sep 1962 Sep 1963 Sep 1966 Sep 1967 Sep 1968

18-0	3-0	8-0	4-12	10-0
18-12	8-12	8-12	5-0	10-12
19-0	9-0	9-0	5-12	11-0
26-12	9-12	9-12	6-0	
	10-0	22-0	6-12	
	10-12	22-12	29-0	
	11-0	23-0		
	11-12	23-12		
	12-0	24-0		
	12-12	24-12		
	13-0	25-0		
	22-12			
	24-0			
	25-0			
	25-12			
	26-0			
	26-12			
	27-0			
	27-12			
	28-0			
	28-12			
	29-12			
	30-0			

Oct 1962 Oct 1963 Oct 1964 Oct 1965 Oct 1968

1-0	8-0	8-0	3-0	28-0
1-12	8-12	12-0	3-12	28-12
2-0	9-0	12-12	4-0	29-0
2-12	9-12	13-0	24-0	
29-0	10-0		26-12	
29-12	10-12		27-0	
30-0	11-0		28-0	
	11-12			
	13-0			
	13-12			
	14-0			
	14-12			
	15-0			
	19-12			
	20-0			

Nov 1962 Nov 1963 Nov 1964 Nov 1965 Nov 1966

3-12	11-0	22-0	4-0	14-0
4-0	11-12		8-0	14-12
12-12	12-0		8-12	28-0
	12-12		9-0	28-12
	13-0		9-12	29-0
	13-12		18-0	

TYPE 3.

Sep 1962	Sep 1963	Sep 1966	Sep 1967	Sep 1968
20-0	8-0	13-0	1-0	29-12
20-12	19-0	13-12	18-0	30-0
21-0	19-12	14-0	18-12	30-12
26-0	20-0	14-12	24-0	
	20-12	15-0	28-0	
	30-12	18-12		
		19-0		
		19-12		
		20-0		
		20-12		
		21-0		
		21-12		

Oct 1963	Oct 1964
12-0	13-12
15-12	14-0
16-0	29-12
16-12	30-0
17-0	
17-12	

TYPE 4

Sep 1962 Sep 1966 Sep 1967 Sep 1968

23-12	4-12	13-0	29-0
24-0		13-12	
24-12		14-0	
25-0		14-12	
25-12		15-0	
		15-12	
		16-0	
		16-12	
		17-0	
		17-12	
		26-0	
		26-12	
		27-0	
		27-12	

Oct 1962 Oct 1963 Oct 1964 Oct 1965 Oct 1968

24-0	1-12	4-12	11-0	3-0
24-12	2-0	5-0	21-12	3-12
25-0		5-12	22-0	
25-12		6-12	22-12	
26-0		7-0	23-0	
27-0		7-12	23-12	
27-12		18-12	24-12	
28-0		19-0	25-0	
28-12		19-12	25-12	
30-12		20-12	26-0	
31-0		21-0	27-12	
31-12		21-12		
		22-0		
		22-12		
		23-0		

Nov 1961 Nov 1962 Nov 1963 Nov 1966

7-0	1-12	29-12	1-0
7-12			1-12
8-0			

TYPE 5

Sep 1964	Sep 1966	Sep 1967
17-12	6-12	30-12
	7-0	
	7-12	
	10-0	
	10-12	
	11-0	

Oct 1962	Oct 1963	Oct 1964	Oct 1965	Oct 1966	Oct 1967	Oct 1968
3-0	4-12	26-0	15-0	20-12	1-0	11-12
3-12	5-0	26-12			1-12	12-0
4-0	5-12	27-0			2-0	12-12
10-0					2-12	13-0
11-0					3-0	13-12
11-12					3-12	14-0
12-12					4-0	29-12
13-0					4-12	30-0
13-12					5-0	
14-0					5-12	
14-12						

Nov 1961	Nov 1962	Nov 1963	Nov 1964	Nov 1965	Nov 1966
24-0	13-0	6-0	8-0	6-0	15-0
24-12	13-12	6-12	10-0	10-0	15-12
27-0	14-0	14-0		10-12	16-0
27-12	27-12	14-12		17-12	16-12
29-12		15-0		19-12	20-0
30-0		15-12		23-0	20-12
30-12				23-12	21-0
				24-0	
				24-12	

TYPE 6

Sep 1962	Sep 1963	Sep 1964	Sep 1965	Sep 1967	Sep 1968
10-0	14-12	18-0	27-12	11-12	15-12
10-12	15-0	20-12	28-0		18-12
11-0	15-12				19-0
11-12	16-0				19-12
12-0	16-12				20-0
	17-12				20-12
	18-0				21-0
	18-12				21-12

Oct 1962	Oct 1965	Oct 1966	Oct 1968
15-0	15-12	11-12	6-12
	16-0	12-0	7-0
		12-12	7-12
		13-0	8-0
		14-12	14-12
		15-0	15-0
		15-12	15-12
		17-12	
		21-0	
		21-12	

Nov 1961	Nov 1962	Nov 1963	Nov 1964	Nov 1965	Nov 1966
19-12	15-12	16-0	11-0	21-0	10-0
20-0	16-0	16-12	12-12	22-0	23-12
20-12	16-12	17-0	13-0	22-12	24-0
21-0		17-12	13-12	25-0	25-12
21-12		18-0	25-0	25-12	26-0
		19-0	25-12		
		19-12	26-0		
		20-0	26-12		
		20-12	27-0		
			27-12		
			28-0		

TYPE 7

Sep 1962	Sep 1964	Sep 1965	Sep 1966	Sep 1967	Sep 1968
8-12	18-12	28-12	1-0	19-0	16-0
9-0	19-0	29-0	1-12	19-12	16-12
23-0	19-12	30-0	2-0	20-0	17-0
	21-12		2-12		22-0
	22-0		3-0		22-12
	22-12		27-0		23-0
			27-12		27-12
					28-0
					28-12

Oct 1962	Oct 1965	Oct 1966	Oct 1967	Oct 1968
15-12	16-12	3-12	29-0	16-0
16-0		4-0	29-12	
18-12		4-12	30-0	
19-0		13-12		
19-12		14-0		
20-0		16-0		
		16-12		

Nov 1961	Nov 1962	Nov 1963	Nov 1965	Nov 1966
2-12	17-0	24-12	26-0	4-0
4-12	17-12	25-0	26-12	4-12
5-0	18-0	25-12		9-0
12-0	18-12			24-12
12-12	19-0			25-0
13-0	19-12			
13-12				
16-0				
16-12				
17-0				
22-0				

TYPE 8

Sep 1964	Sep 1966	Sep 1967	
23-0	28-0	20-12	
23-12	28-12		
24-0	29-0		
24-12	29-12		
25-0	30-0		
	30-12		

Oct 1962	Oct 1964	Oct 1966	Oct 1968
18-0	4-0	1-0	2-0
20-12		1-12	2-12
21-0		9-0	
22-0		9-12	
22-12		31-12	
23-0			
23-12			

Nov 1961	Nov 1962	Nov 1966
6-12	1-0	3-0

TYPE 9

Sep 1962	Sep 1964	Sep 1965	Sep 1968	Nov 1966
1-0	27-12	1-0	1-0	5-0
1-12		1-12	6-0	
5-0			6-12	
6-0				
6-12				

TYPE 10

Nov 1961	Nov 1963	Nov 1965
19-0	18-12	11-0
	21-0	
	21-12	
	22-0	

TYPE 11

Nov 1961	Nov 1965
26-12	16-12

TYPE 12

Sep 1962	Sep 1964	Sep 1965	Sep 1968	Oct 1966	Nov 1961	Nov 1966
7-0	25-12	2-0	2-0	2-0	2-0	3-1
8-0	26-0	14-12	2-12	2-12	3-0	6-12
	26-12	15-0	3-0	3-0	4-0	11-0
	27-0	15-12	3-12		15-0	
		16-0	4-0			
		24-12	4-12			
		25-0				

TYPE 13

Sep 1962	Sep 1964	Sep 1965	Nov 1965	Nov 1966
2-0	2-12	3-0	11-12	10-12
	3-0	9-0		
	4-0	9-12		
	5-0	10-0		
	10-0	10-12		
	10-12	11-0		
	11-0	11-12		
		12-0		
		12-12		
		13-0		
		13-12		
		14-0		
		27-0		

TYPE 14

Sep 1962	Oct 1964	Nov 1964	Nov 1965
16-0	27-12	5-0	15-12
17-0	28-0	5-12	16-0
	28-12	6-0	20-0
	29-0	6-12	20-12
		7-0	
		7-12	
		8-12	
		9-0	

TYPE 15

Sep 1968	Oct 1966	Nov 1961	Nov 1966
1-12	8-12	1-12	9-12
17-12	17-0	14-0	
		14-12	

TYPE 16

Sep 1966	Oct 1962
11-12	4-12
12-0	
12-12	

TYPE 17

Sep 1964	Sep 1965	Nov 1966
2-0	2-12	5-12
5-12	3-12	6-0
6-0	4-0	7-0
7-0	4-12	7-12
	5-0	8-0
	5-12	22-12
	6-0	23-0
	6-12	
	8-0	
	8-12	
	25-12	
	26-0	

TYPE 18

Nov 1961	Nov 1965	Nov 1966
28-0	6-12	17-0
28-12	7-0	17-12
29-0	7-12	18-0
	13-12	18-12
	17-0	19-12
	18-12	29-12
	19-0	30-0
		30-12

TYPE 19

Sep 1962	Nov 1965
2-12	12-0
3-0	12-12
3-2	
4-0	
4-12	

TYPE 20

Sep 1964	Sep 1965	Nov 1966
4-12	26-12	21-12
7-12		22-0
8-0		
8-12		
9-0		

TYPE 21

Sep 1968	Oct 1964	Nov 1964
5-0	6-0	19-12
5-12		20-0
		20-12
		21-0
		21-12

TYPE 22

Sep 1965	Nov 1964	Nov 1966
16-12	14-12	8-12
17-0		
17-12		
18-0		
18-12		
19-0		
19-12		
20-0		
21-0		
21-12		
22-0		

TYPE 23

Oct 1963	Nov 1966
6-12	19-0
7-0	
7-12	

TYPE 24

Sep 1965
22-12
23-0
23-12
24-0

TYPE 25

Nov 1964
15-0
16-0
16-12
17-0
17-12
18-0
18-12
19-0

