Classification of 1937 Synoptic Charts
and
Type "A" Synoptic Situation

by

Captain R. E. Ellsworth

and

Captain Von R. Shores, Jr.

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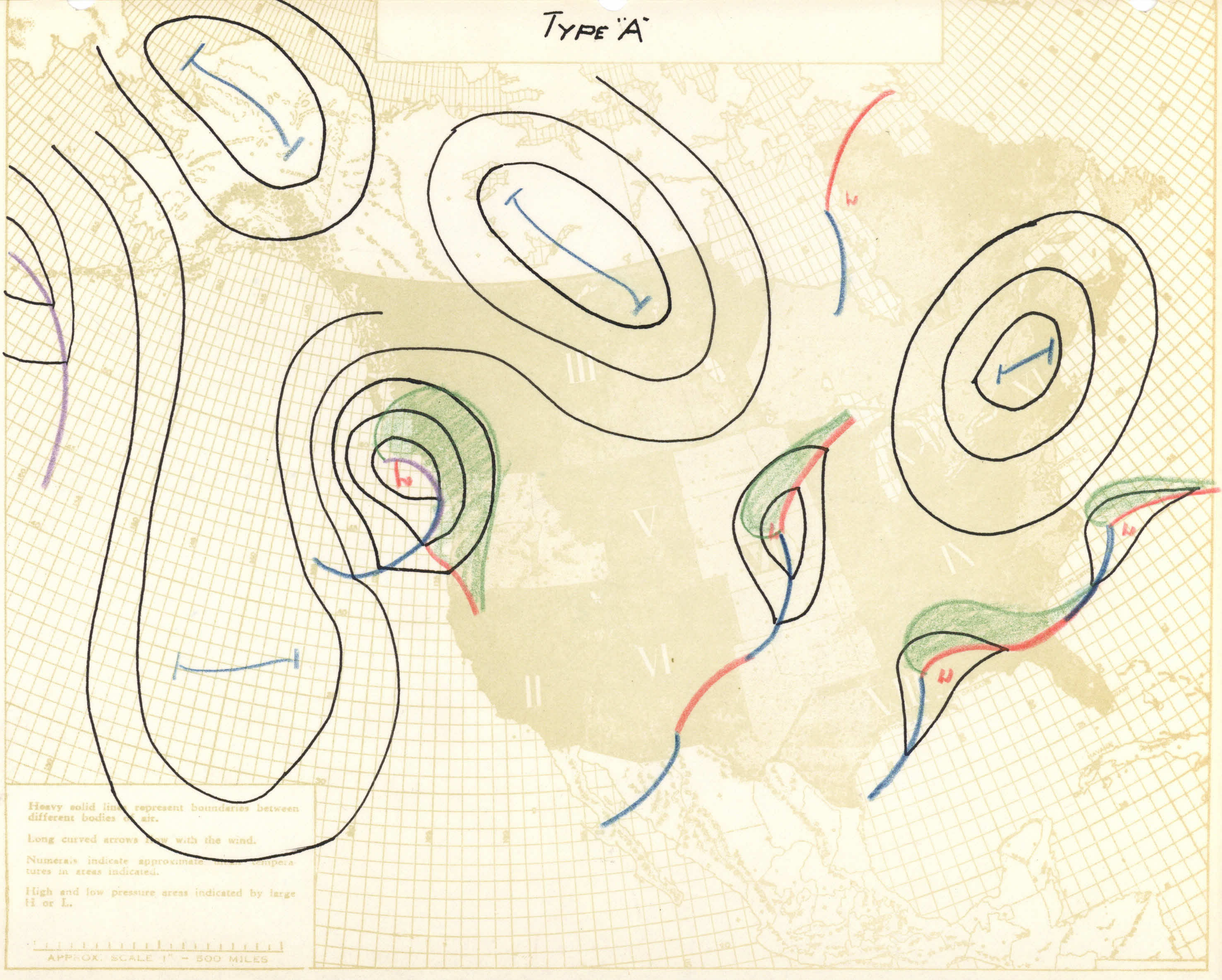
From the idealized general circulation of the atmosphere as shown by Dr. Krick it is seen that the high and low pressure centers have a relatively fixed position in the maintainence of that circulation. Land and water influences somewhat modify this ideal picture and further complicate it, as also does the insolation variation with the seasons. Added to this picture are the polar outbreaks which transport the cold air masses south of the polar front forming the wave cyclones. Combined too are all the effects of local variations, making the picture so complicated that there seems, many times, doubt as to the ability of anyone to consistently forecast with reasonable accuracy beyond the twenty-four value of the synoptic chart.

Dr. I.P.Krick has developed a technique of long range forecasting based on composite type maps and periodicity for weekly forecasts, and on recurrent types, probabilities, and changes in streamline patterns for prognostications of three, and even up to six months. Some sure method for interconnecting the types, that is to say, some means of forecasting future types beyond the probability stage seems at this time somewhat vague. Therefore the purpose of this research was to classify, by existing types, the synoptic charts drawn by Dr. Krick during the year 1937; and to determine from those classifications whether some synoptic situation presages a change of type and identifies or labels the succeeding type unmistakeably. Other purposes of the research being to simplify, with accuracy, the type "A" synoptic situation and to reduce to writing the features thereof.

For the above purposes the types as indicated by R. Elliot of the California Institute of Technology, were used as guides and copies of Phase I of his Types "A","B","C", and "E" are included herewith

TYPE "A"



Heavy solid lines represent boundaries between different bodies of air.
Long curved arrows flow with the wind.
Numerals indicate approximate temperatures in areas indicated.
High and low pressure areas indicated by large H or L.
APPROX. SCALE 1" = 500 MILES

Type "B"

To seldom drawn into systems.

Heavy solid lines represent boundaries between different bodies of air.

Long curved arrows flow with the wind.

Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

APPROX. SCALE 1" = 500 MILES

TYPE "C"

Heavy solid lines represent boundaries between different bodies of air.

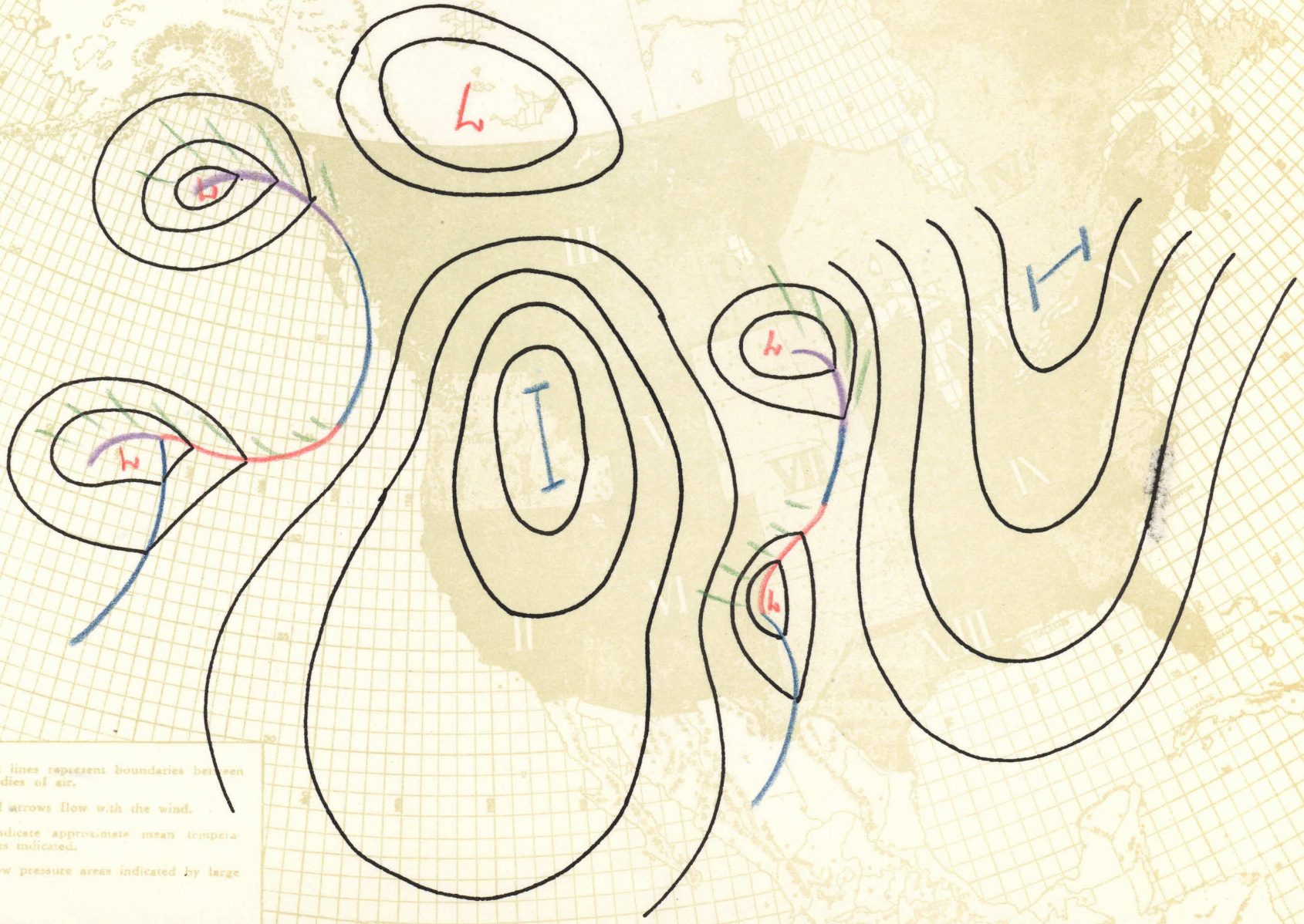
Long curved arrows flow with the wind.

Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

APPROX. SCALE 1" = 500 MILES

TYPE "E"



Heavy solid lines represent boundaries between different bodies of air.

Long curved arrows flow with the wind.

Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

APPROX. SCALE 1" = 500 MILES

Showing Basis (geographical) for Columns "W & E" of Classification sheets. Centers (cyclonic) appearing within boundaries were tabulated with number of sector.

Heavy solid lines represent boundaries between different bodies of air.

Long curved arrows flow with the wind.

Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

APPROX. SCALE 1" = 500 MILES

CLASSIFICATION OF 1937 CHARTS

JANUARY

DAY	TYPE	PHASE	W	E	REMARKS
1	A	II	2	3	
2	A	III	3	2	
3	A	II	4/3	-	
4	A	I	3	3	
5	A	III	2	3	
6	A	III	3	2	
7	A	III	3	2	
8	A	II	3	2	
9	A	I	3	2	
10	A	II	2	3	
11	A	III	2	2	
12	A	III	2	3	
13	A	I	3	3	
14	A	I	3	3	
15	A	I	-	3	
16	A	III	2	2	
17	A	II	3/2	2	
18	A	III	2	3	
19	A	II	2	2	
20	A	I	3/2	2	
21	A	II	3	3/2	
22	A	III	2	2	
23	A	I	2	2	
24	A	III	3/2	2	
25	A	I	2	3	Good "A I"
26	A	II	2	2	
27	A	I	3/1	1	
28	A	I	3/1	1	
29	A	II	3/2	3/2	
30	A	III	3/2	1	
31	A	I-II	3/2	2/1	

FEBRUARY

DAY	TYPE	PHASE	W	E	REMARKS
1	A	III	2	4/2	
2	A	II	3	3/2	
3	E	O	3	2	
4	E	I	3	-	
5	E	II	-	3	
6	A	II	3	3	
7	A	III	-	3	
8	A	III	3	-	
9	B	I	2	3	Polar out break
10	B	III	-	2/3	"
11	E	III	4/3	4/2	"
12	E	-	-	4/1	"
13	B	I	4/3	3/2	
14	B	II	3	2	
15	B	II	4/3	2	
16	B	III	-	2/2	
17	B	III	3/4	2	
18	B	I	4/3	2	
19	B	I	4/2	-	
20	B	II	3	4/2	
21	B	II	3	4/2	
22	A	II	3/4	2	
23	A	I	4/3	3	
24	A	I	2	2	
25	A	II	-	3/2	
26	?	III	3/2	3	May be "A" moved S.
27	E	III	3/2	-	
28	E	II	-	2	Good "E"

MARCH

DAY	TYPE	PHASE	W	E	REMARKS
1	E	II	-	4/2	
2	E	III	-	3	
3	B	I	-	-	
4	B	II	3	3	
5	B	III	2	2	
6	B	III	-	2-2	
7	E	I	432	2-2	
8	E	II	-	3/2	
9	E	II	-	2	Strong Polar outbreak
10	E	III	4/3	-	"
11	E	I	4	2	"
12	E	I-II	3	2	"
13	E	II	2	2	"
14	E	III	2	2	"
15	C-B	III	1 2	2 2	
16	C-B	III	-	2	No Basin High
17	E	I-III	4/3	3	
18	E	I	3	3	Polar Outbreak
19	E	I	3	3	"
20	E	I-II	3	-	"
21	E	I	-	2	"

APRIL

DAY	TYPE	PHASE	W	E	REMARKS
1	B	I-II	3	-	
2	B	II	*	3	
3	B-C	III	3	2	
4	E	I	4/2	-	
5	E	I	3/3	4	Good "E"
6	E	II	-	3	" "
7	E	III	-	3	
8	B	I	3	-	Polar out break
9	B	II	-	2	" "
10	B	III	4	2/2	" "
11	E	III	-	-	" "
12	E	I	3	-	
13	E	II	3	-	
14	E	I	3/3	3	Polar outbreak
15	E	II	3	3	" "
16	E	III	-	2/2	" "
17	B	I	4/3	-	
18	B	I½	4/3	-	
19	B	II½	-	4	
20	B	III	4/3	2	
21	E	III-II	3/2	2	

MARCH (contd)

22	C	I	2	-	
23	A	III	-	-	
24	A	I	3/2	3	
25	A	II	-	3/2	
26	A	III	-	2-2	
27	A	II-III	-	2-2	
28	A	II	-	-	
29	B	?	2	-	Similar to B-C
30	B	III-I	2	-	
31	B	I	4	2/1	Center deepening in N.F.S. Dakota

APRIL (contd)

A	I	-	3/2	
A	II	3	2	
E	I	3	2	
E	I-II	3	2	
E	III	-	2	
A	II	-	3	
B	II	-	3	
B	II	3	2	
E	I	3	-	

MAY

1	B	I	4/3	-	Tg
2	B	I	3/4	-	
3	B	I	3/1	1	
4	B	II	3	1	
5	B	II	3	-	
6	E	III	-	3/2	
7	E	III	4	2	Good "E III"
8	E	III-I	-	2	
9	B	II	-	4	
10	B	III	-	3	
11	B	I	4	-	
12	B	II	4	-	
13	B	II	3	3	
14	B	III	-	3/2-	
15	B	III	4/4	2/2	
16	E	I	344	-	
17	E	I	-	3	
18	E	II	3	3	
19	E	III	-	2	Tg
20	E	III	3	2	"
21	B	I-II	4/3	-	"
22	E	II	334	-	"
23	E	II	-	3	
24	E	I	-	4	
25	B	I	3/4	-	Tg
26	B	I	3/4	-	
27	B	II	3	3	
28	E	I	-	22	
29	E	I	4-4	-	
30	E	I	3-4	4	

JUNE

B-C	II	4/3	3	
B-C	III	4/3	2	
E	I	3/3	3	
E	I	3/2	3	
E	I	3	4	
E	I	3	4	
E	II	-	4	
E	II	4	2	
E	I-II	3	-	
E	II	4/3	4/3	
E	III	2	2	
B	I	4	-	
B	I-II	4/3	-	
B	II	3	3	
B	III	-	2/2	
E	I	3	2	
E	I-II	3	-	
B	I	-	3	
B	II	-	2	
B	III	4	-	No Basin High
B	II	4/3	4/3	Basin High
E	III	-	2	
E	II	4	2	
B	I	4	-	
B	I-II	4/3	-	
B	II	3	4	
B-C	III	433	3	
B-C	III	2	2/2	
B-C	II	-	2/3	Good B-C II
B-C	III	-	222	

	JULY					AUGUST				
1	B	III	-	3/2		B	I	-	-	
2	B	I	3/4	-		B	I	3	3/2	
3	B	?	3	-		B	III	-	-	
4	B	II	3	-		B	II	-	-	
5	B	?	3	-		B	I	-	-	
6	B	I	-	2	Tg	B	I-II	4	-	
7	B	II	-	-	"	B	II	-	4/3	
8	B	III	-	-		E	II	4/3	2-2	
9	B-C	I	3	-	Tg	B-C	II	3	-	
10	B	?	-	-		B-C	II	-	-	
11	B	II	3-3	-		B-C	II	-	3	
12	B	II	-	2	Tg	E	I	-	3	
13	B	II	4	2		E	II	2-2	2-2	Perfect E II
14	B	I	3	4		B-C	I	-	-	
15	B	I	4	-		B	I	-	-	Tg
16	?	-	4	3	Pacific High completely	E	II	4	-	Rapid change to E.
17	?	-	3	3	filling Gulf of Alaska	E	I	3	3	Good EI
18	E	I	3	-		E	II	4	2-2	
19	E	I	3	2		E	II	4	3	
20	B-C	I	4/3	2		E	I	3/4	-	
21	B-C	I	-	2		E	I-II	3	3	
22	B-C	I	-	-		E	III	3	2	
23	B-C	II	3/4	-		E	III	3	2	
24	B-C	II	-	4		E	III	-	2-2	
25	B-C	III	3	4		B	I	4	2	
26	B-C	III	-	4	No Activity in SW	B	I	-	4/2	Tg front
27	B-C	III	-	4		B	III	-	2	"
28	B-C	I	4	4		B	III	-	-	"
29	B-C	II	2	4		B	III	-	-	"
30	B-C	II	2	-	Tg front Prevalent entire	B-C	I	4	1/2	
31	B-C	II	-	-	month.	B-C	II	4/2	-	
		SEPTEMBER					OCTOBER			
1	B	I	3/2	-	Tg	A	I	414	-	Good A I.
2	E	II	4/3	-		A	III	2	-	
3	E	II	4/3	-	Polar Outbreak	A	III	3	2	
4	E	I	3	-	"	B	I	3	2	
5	E	II	3/1	2	"	B	I	4/3	2	
6	B	I	3/2	-	Tg front.	E	II	4	-	
7	B	I	3/2	-	"	E	II	-	4/3	
8	B	I	3-2	-	"	E	III	-	3/2	
9	B	II	4/4	2		E	I	3	-	
10	B	II	433	-	Tg -	E	II	-	2	
11	B	III	3	2		E	III	-	2	
12	B	III	-	2		E	II	-	4	
13	B	III	4	2-2		C	I	3	3	Good C I.
14	B	III-I	4	3/2		C	II	-	-	
15	B	I	4/3	-		E	III	-	-	
16	B	II	3-3	3-2		E	III	-	-	
17	B	III	4	-	Tg	E	I	432	-	Good Precip from Tg
18	E	II	4	-		E	I-II	432	-	" " " "
19	E	II	-	2-2		B	III	4/3	-	
20	E	III	-	2/2		B	II	4	-	

	SEPTEMBER (contd)					OCTOBER (contd)				
21	E	III	-	-		B	II	4	-	
22	E	III	4	-		B	III	3	-	
23	B	I	3	-		B	III	-	3/2	
24	B	I	4	-	Tg	B	I	4	-	
25	B	I-II	334	-	"	B	I	4	-	
26	B	II	-	2		E	I	-	3	
27	B	III	-	-		E	II	-	3/2	
28	B	III	3	2		E	III	4	2	
29	A	II	-	1-2		E	III	4	3/2	
30	A	III	-	1		E	I	4	3	
31						E	I	-	-	

	NOVEMBER					DECEMBER				
1	E	I	4	-		?	-	-	-	Transitional to TB
2	E	II	4	-		C	II	-	1	
3	B	III	-	3		B	I	-	-	
4	B	I	4	-		B	II	4	-	Polar Outbreak
5	B	II	3	-		B	III	3	-	" "
6	B	II-III	-	4		B	III	-	3-3	" "
7	E	I	3	-		B	I-II	4	3/2	" "
8	E	I-II	4	-		B	II	4	4	" "
9	E	II	411	4		B	III	4	2/1	" "
10	E	II-III	2	-		E	III	-	1	
11	E	II-III	2	-		E	III	-	-	
12	E	III-I	2	2		?	-	-	-	
13	E	I	4	3/2		B	III	3	-	
14	E	I	3	3/2	Polar outbreak	B	III	234	-	
15	E	I	3	2	" "	E	I	2	-	
16	E	II	2	2	" "	E	II	3	3	
17	E	III	1	2	" "	E	II	4/3	4/3	
18	E	I	3	-	" "	E	III	2/3	3/2	
19	E	II	2	2	" "	B	I	3	-	
20	E	II	-	2-2	" "	B	II	4	-	
21	E	II-III	-	-	" "	B	III	4	-	Almost "A"
22	E	I	-	-		A	I	4/1	-	
23	E	?	-	-		A	I*II	2	3	
24	E	III	-	-		A	II	4	2	
25	B	I	-	-		-	-	-	-	Merry Xmas
26	B	I	-	-		C	III	3	-	
27	E	I	4/3	-		E	I	3	-	
28	B	III	4	-		E	II	2	4/2	
29	B	III	4	3		E	I	-	-	Polar Out break
30	B	II	4	-		E	I	-	-	" " "
31						B-C	-	4/4	-	

SPECIFIC CONCLUSIONS

1. Total number of days occurrence:

Type "A"	57		15.6%
Type "B"	132		36.1%
Type "C"	5		1.4%
Type "E"	135		37.0%
Type "B-C"	29		8.0%
Unclassified	7	(or missing)	1.9%
	365		100.0 %

2. Total number of periods: (a period arbitrarily being considered persistence of the type for more than one day.)

Type "A"	9	(occurred 1 time for 1 day)
Type "B"	26	(" 2 " " " ")
Type "C"	1	(" 3 " " " ")
Type "E"	28	(" 3 " " " ")
Type "B-C"	6	(" 4 " " " ")

3. Total number of days in periods:

Type "A"	56
Type "B"	130
Type "C"	-
Type "E"	132
Type "B-C"	25

4. Average persistence of each type:(based on periods, see # 2)

Type "A"	6 days
Type "B"	5 "
Type "C"	-
Type "E"	5 "
Type "B-C"	4 "

5. Type "A" was the outstanding type in persistence, running from January 1 to February 2, or about 5½ cycles if a cycle were taken as the average number of days persistence of that type from paragraph 4 above.

6. Type "E" was the second outstanding type in single persistence running from November 7 - 24, or about 3 3/5 cycles.

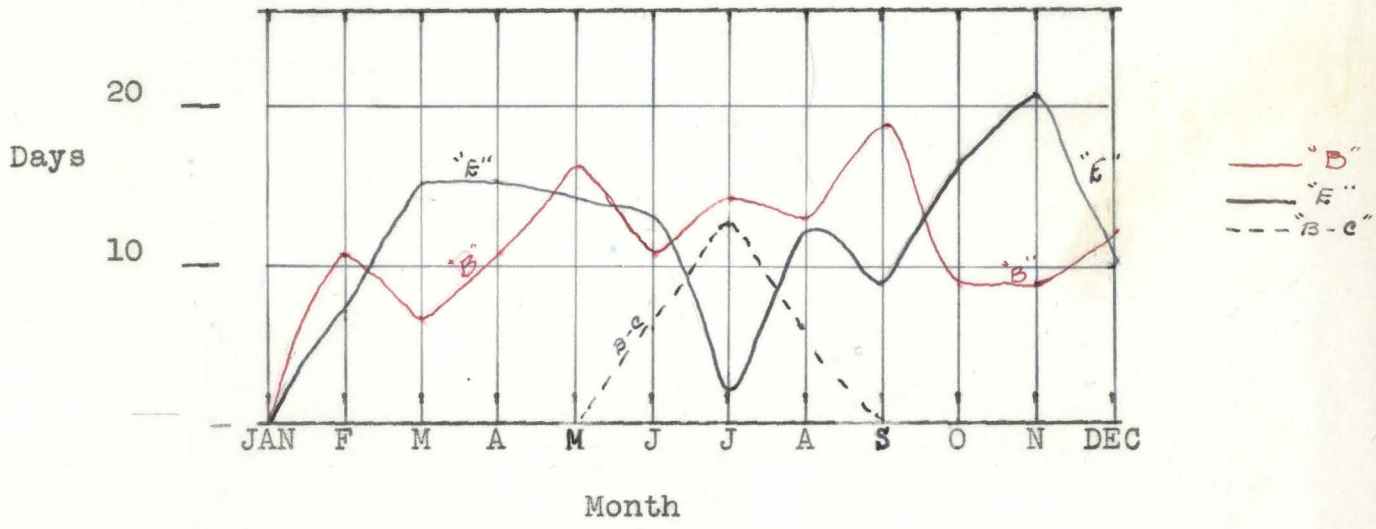
7. Type "B-C" occurred for twelve days or for three complete cycles for the third longest example of persistence on July 20 - 31.

8. Type "A" occurred last in the spring April 22 - 23, and first the following fall September 29 - 30, indicating that it is a type to be found only in the colder half of the year in its pure form.

9. Occurrence of types by months: (in total number of days)

	A	B	C	E	B-C	?
Jan	31	-	-	-	-	-
Feb	9	11	-	7	-	1
Mar	6	7	1	15	2	-
April	3	11	-	15	1	-
May	-	16	-	14	-	-
June	-	11	-	13	6	-
July	-	14	-	2	13	2
Aug	-	13	-	12	6	-
Sept	2	19	-	9	-	-
Oct	3	9	2	17	-	-
Nov	-	9	-	21	-	-
Dec	3	12	2	10	1	3

10. Occurrence curves of the three most common types: (Ordinate is divided into twelve parts representing months while against this is plotted the total days occurrence in the month.)



11. The mixed type (or combination of types B and C) "B-C" occurred most frequently in June, July, and August -- August being the month of peak occurrence when the type occurred twice as many days as in either June or July. This would seem to indicate that type "B-C" is a summer type in the same sense that Type "A" is a winter type.

12. The month of maximum Type "B" occurrence was September, while the maximum of Type "E" occurred two months later.

13. It must be remembered that the foregoing conclusions were based on, and apply to, only one year of synoptic situations.

The greatest value which may be assigned to the conclusions drawn from events of 1937 is to be found in the indications which may be made the basis for further study. If results from investigations of a number of years warrant, then specific general conclusions may be drawn. The danger, and the fallacy behind, any attempt to make practical application of results, unsubstantiated, from a study of meteorological events for only one year is obvious.

GENERAL CONCLUSIONS

1. The entire month of January 193/ was classified as Type "A". etailed information on this type included later.

2. On the example of Type "B", the notation " Tg seldom drawn nto the system" proved misleading since Tg was more often drawn nto the system than not.

3. Each type persisted for a period during which the conditions n the general circulation permitted that characteristic type to aintain itself. That is to say, that change from any type to another ype is due to a shift in the general circulation.

4. When the polar front for any reason shifted north, the sub- olar front was drawn into the circulation on the chart and affected he weather accordingly.

These shifts were especially noticable when in Type "B" there as a northward movement of the system, a type closely resembling ype "C" would appear in the southwest or even out over the Pacific s far as Hawaii.

5. An "E" Type, which closely resembles a "B" Type that has moved n at lower latitudes, was never accompanied by an extreme southerly ystem on the synoptic chart. This would seem to indicate that the ub-polar front in these instances moved either southward off the hart or into a region of such small contrast of property that its oticable characteristics vanished. Thus it would appear that the ub-polar front moves north and south with the polar front and at ery nearly a constant distance, which could be called a wave length n a north-south direction. W.C.Willet of M.I.T. seems to ignore his fact in criticizing the method of long-range forecasting of he Scripps Institute by ocean temperatures.

6. In addition to a north-south wave length there seems to be indicated an east-west wave length of approximately the width of the United States. It was consistently noticed that when a system left the east coast of the U.S. a new system appeared on the west coast. And it was never observed that a system of major importance existed between the two, let us say, major systems -- one entering the U.S. on the west coast and one leaving on the east coast. If there was a major system within the continental limits of the U.S. there was no new major system until it had reached the immediate vicinity of the east coast.

7. It appeared at times that the dividing line between Type"B" and Type "E" used as the basis for this classification is thinly drawn and some definite feature is needed to separate the two types more clearly in practice.

8. It was found in numerous instances that the continuity of Elliot's types was not clear enough to exactly classify each map. It is believed that more continuity would be gained by making the "Phase" a definite time interval -- say 24 hours, in order that the forecaster may anticipate the complete picture on each succeeding map.

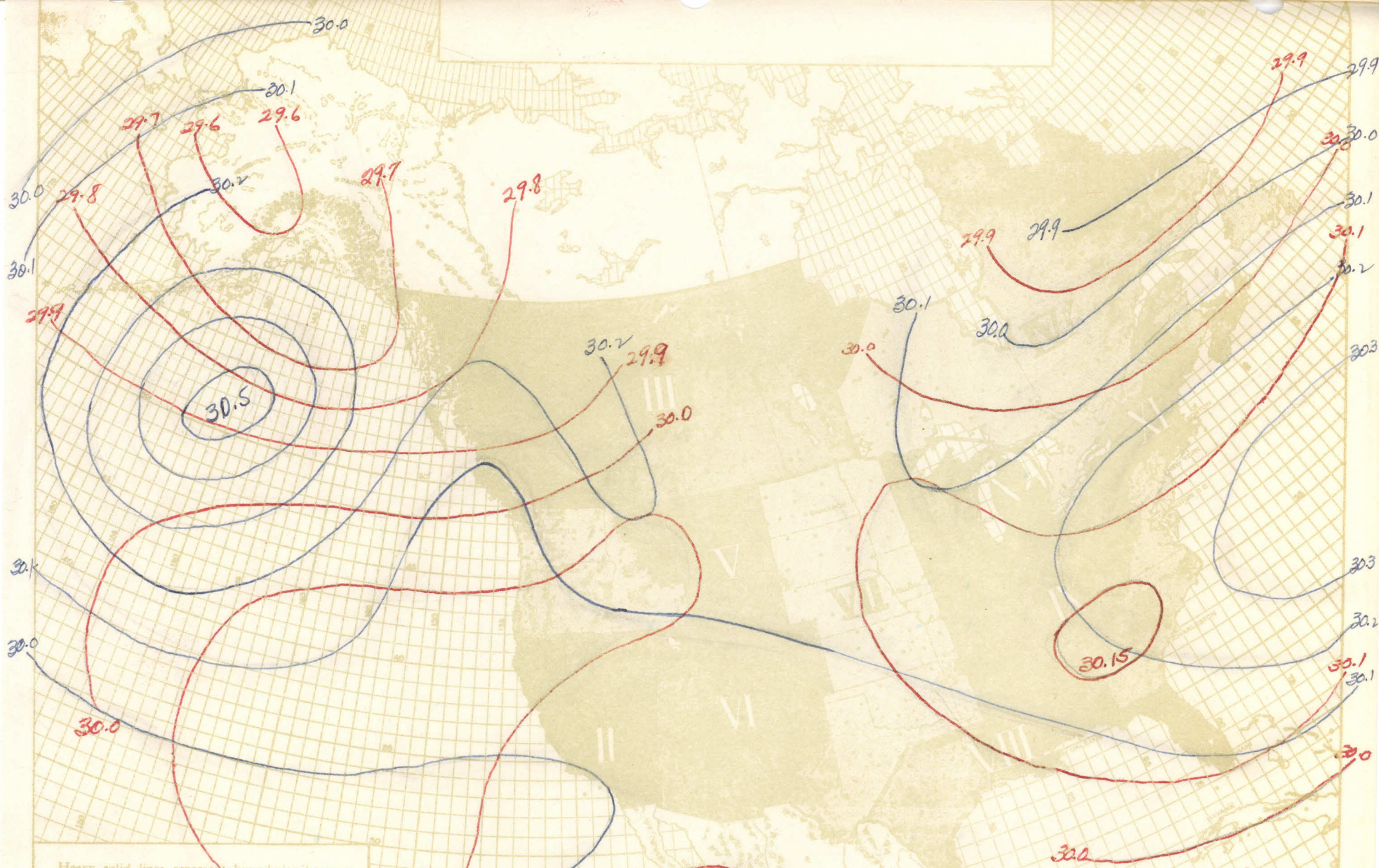
9. Special effort in this research was given to the revision of the Type "A" composite map set since this type situation was so much more prominent in this year than in any other of the five year period 1936 - 1940 inclusive. This type is discussed in considerable detail in a later section.

10. Dr. Krick states that Type "A" seldom appears after March. This was borne out in the investigation. However due to the seasonal shift of the circulation a type so closely resembling an "A" Type is formed that it appeared reasonable to suggest this situation as a spring "A" Type. The normal seasonal shift of the Pacific Anti-

It is believed that Type "A" represents a north and west shift of these centers and thus Type "A" in a seasonally modified form can appear in the spring. This is believed to be true also of the other types , but may be quite hidden due to the fact that seasonal and other modifications tend to obscure the shifts.

Thus we may expect Type "A" situations similar to those in January 1937 when the outbreaks of polar air again reach their extreme westward positions, and when the Pacific anticyclone reaches its most northerly position concurrently. Activity eastward from the Pacific coast will then depend on the westward and northward shift of the Bermuda high. This line of reasoning is logical and applicable to all the different types. Each type merely representing cyclonic and frontal positions resulting from shifts of anticyclonic centers, and trajectories thus necessitated to conform with the general circulation of the atmosphere.

No type will fit all situations, nor will any group of types, because of ever changing positions of pressure centers -- that is, centers of action and transport of different masses of varying properties due to the shifted trajectories and periods of stagnation in source regions. However, types may be found, in fact some have been found, which fit fairly well situations which recur more or less frequently. The Type "A" maps included hereafter are examples of a representative set of types for one fairly frequently recurring situation. Types "B" and "E" together predominate the synoptic situations the greater portion of the year.



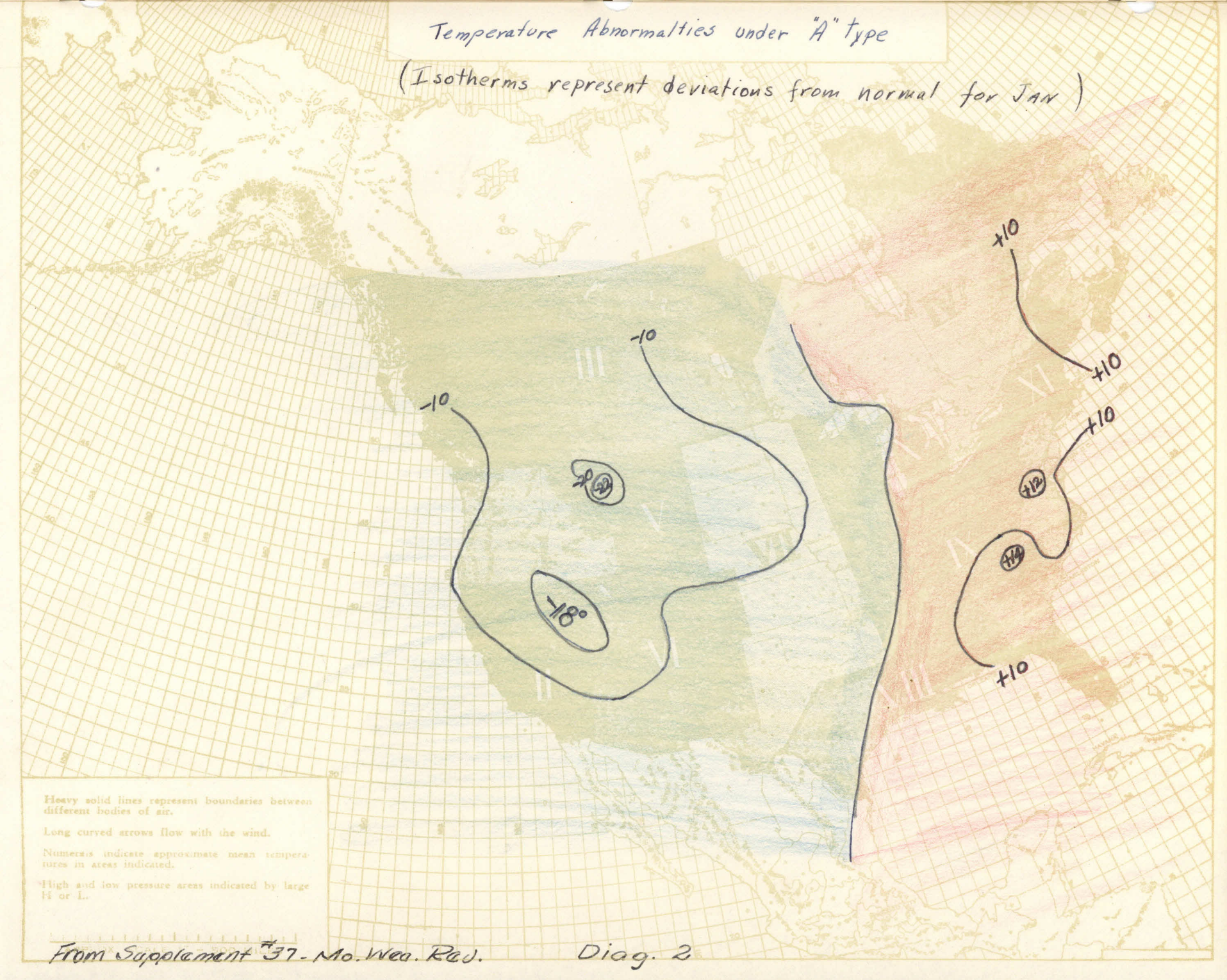
Pressures in Red are normal Pressures for JAN in inches of Hg.
Pressures in Blue are pressures for Jan 1937 or for type "A", in inches of Hg.

From Supplement #37, Mo. Wea. Rev.

Diag. 1

Temperature Abnormalties under "A" type

(Isotherms represent deviations from normal for JAN)



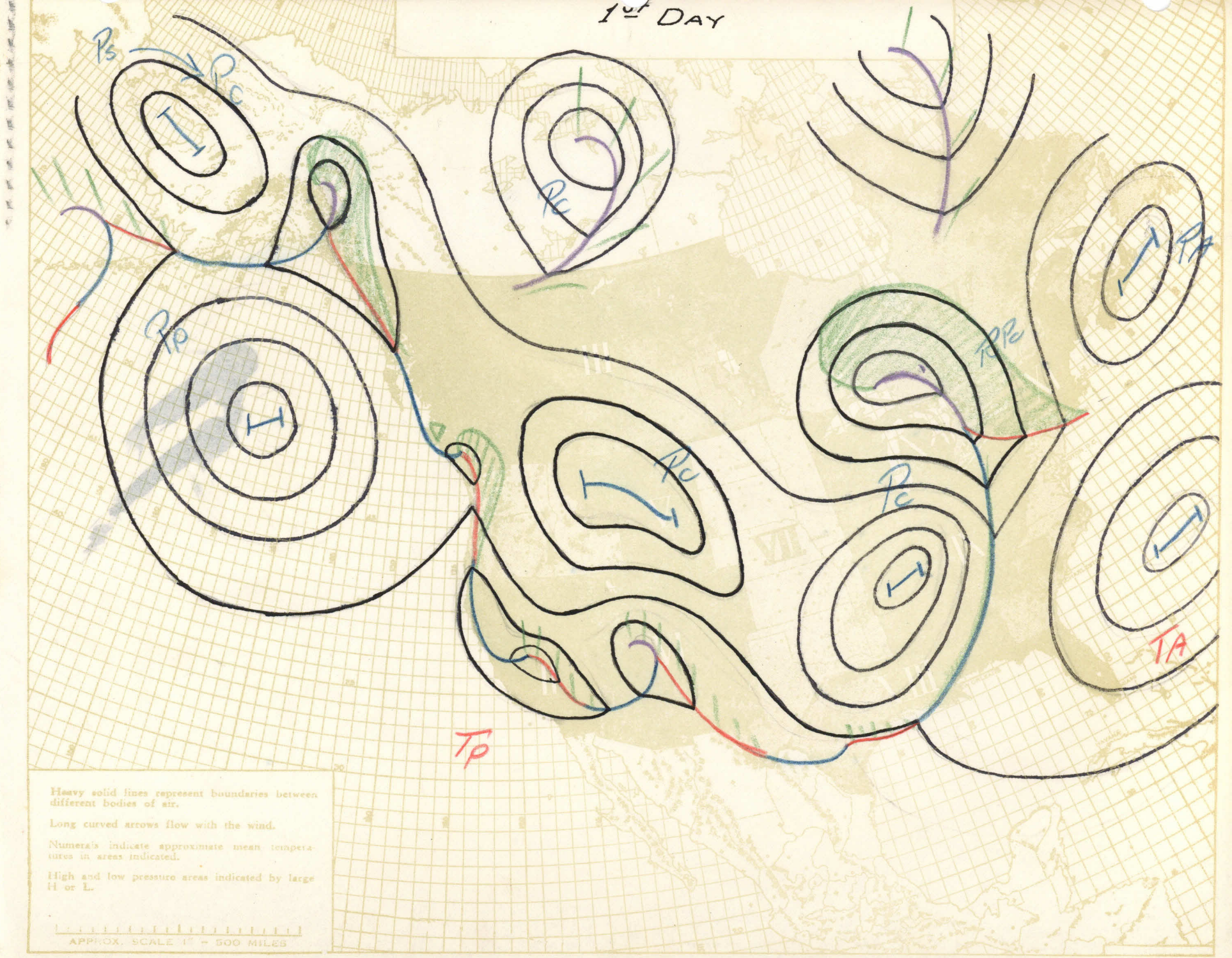
Heavy solid lines represent boundaries between different bodies of air.

Long curved arrows flow with the wind.

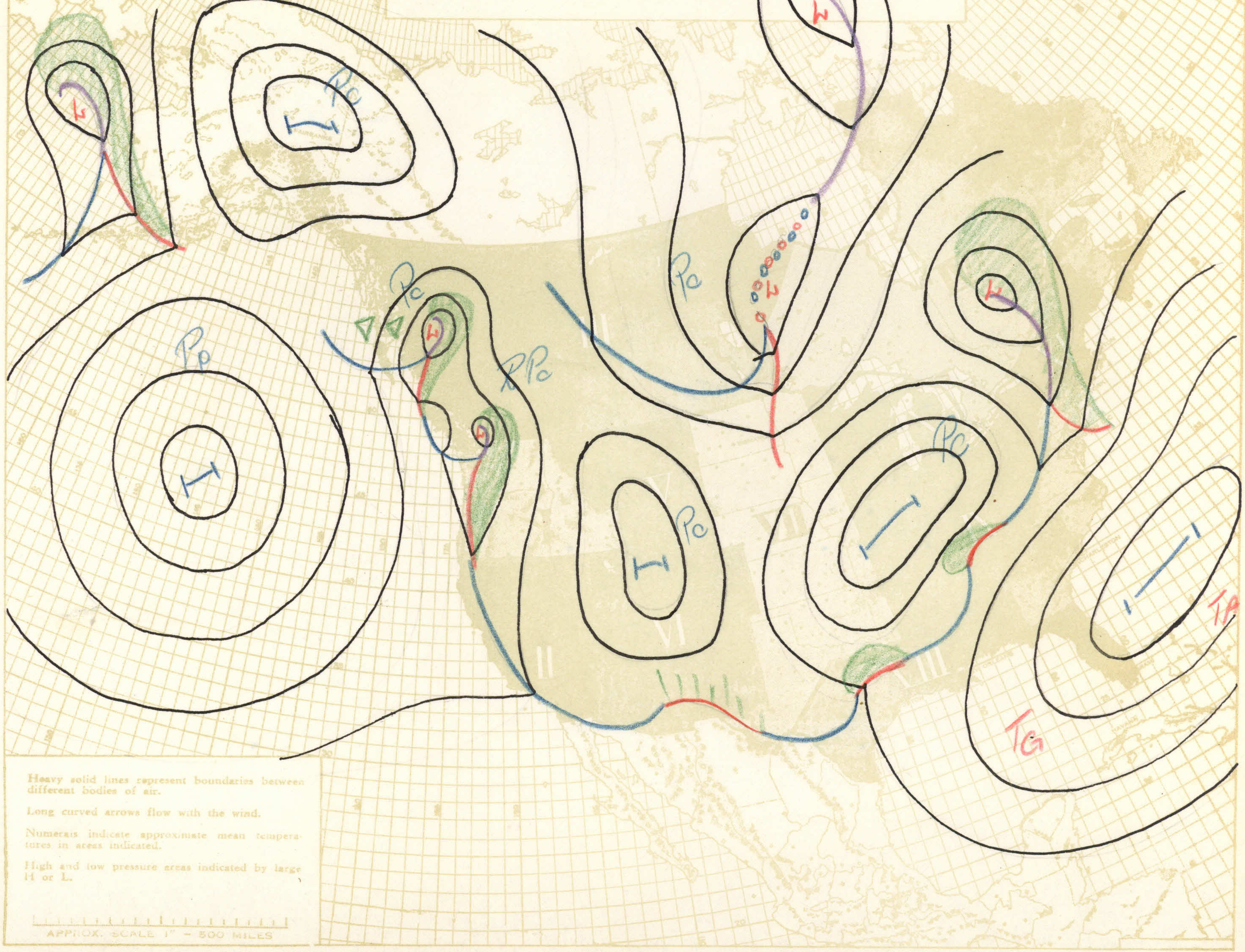
Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

From Supplement 37 - Mo. Wea. Rev. Diag. 2


1st DAY
Ps
Pc
Pc
Pp
Pc
Pc
Pc
Pc
TA
Tp
Heavy solid lines represent boundaries between different bodies of air.
Long curved arrows flow with the wind.
Numerals indicate approximate mean temperatures in areas indicated.
High and low pressure areas indicated by large H or L.
APPROX. SCALE 1" = 500 MILES

2d Day



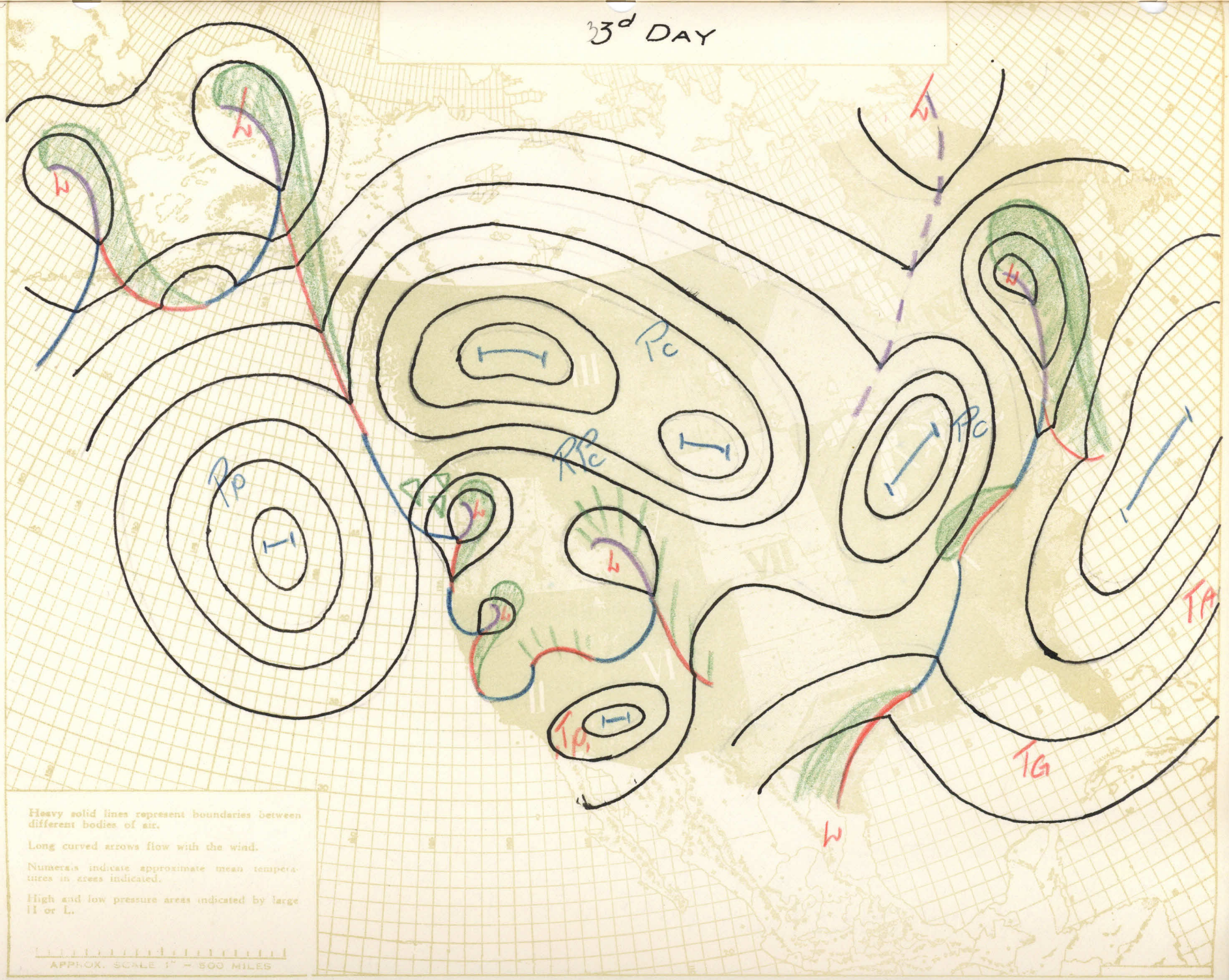
Heavy solid lines represent boundaries between different bodies of air.

Long curved arrows flow with the wind.

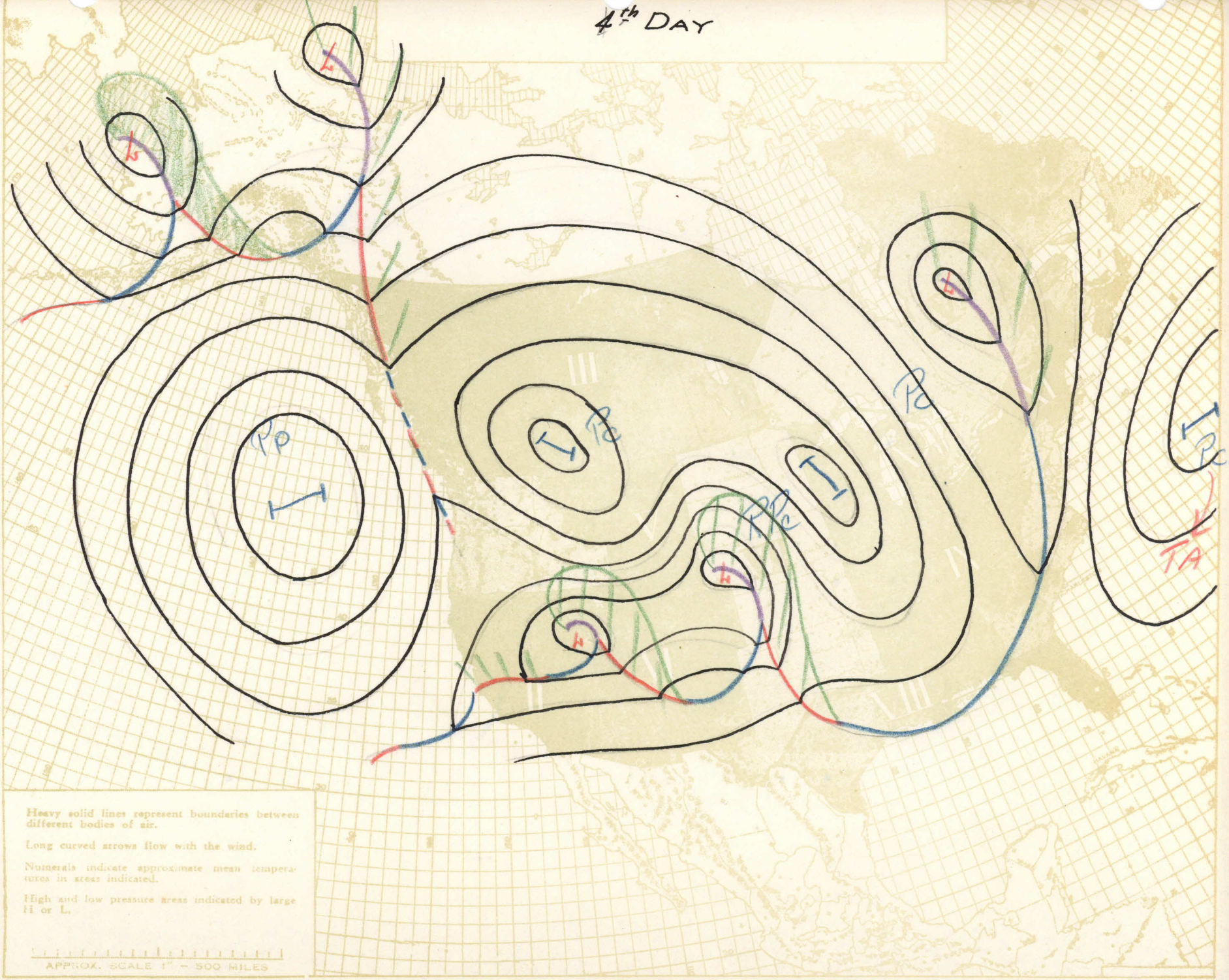
Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

APPROX. SCALE 1" – 500 MILES


33d DAY
Pc
Pc
Pc
Pp
Tp
TA
TG
Heavy solid lines represent boundaries between different bodies of air.
Long curved arrows flow with the wind.
Numerals indicate approximate mean temperatures in areas indicated.
High and low pressure areas indicated by large H or L.
APPROX. SCALE 1" = 500 MILES

4th DAY



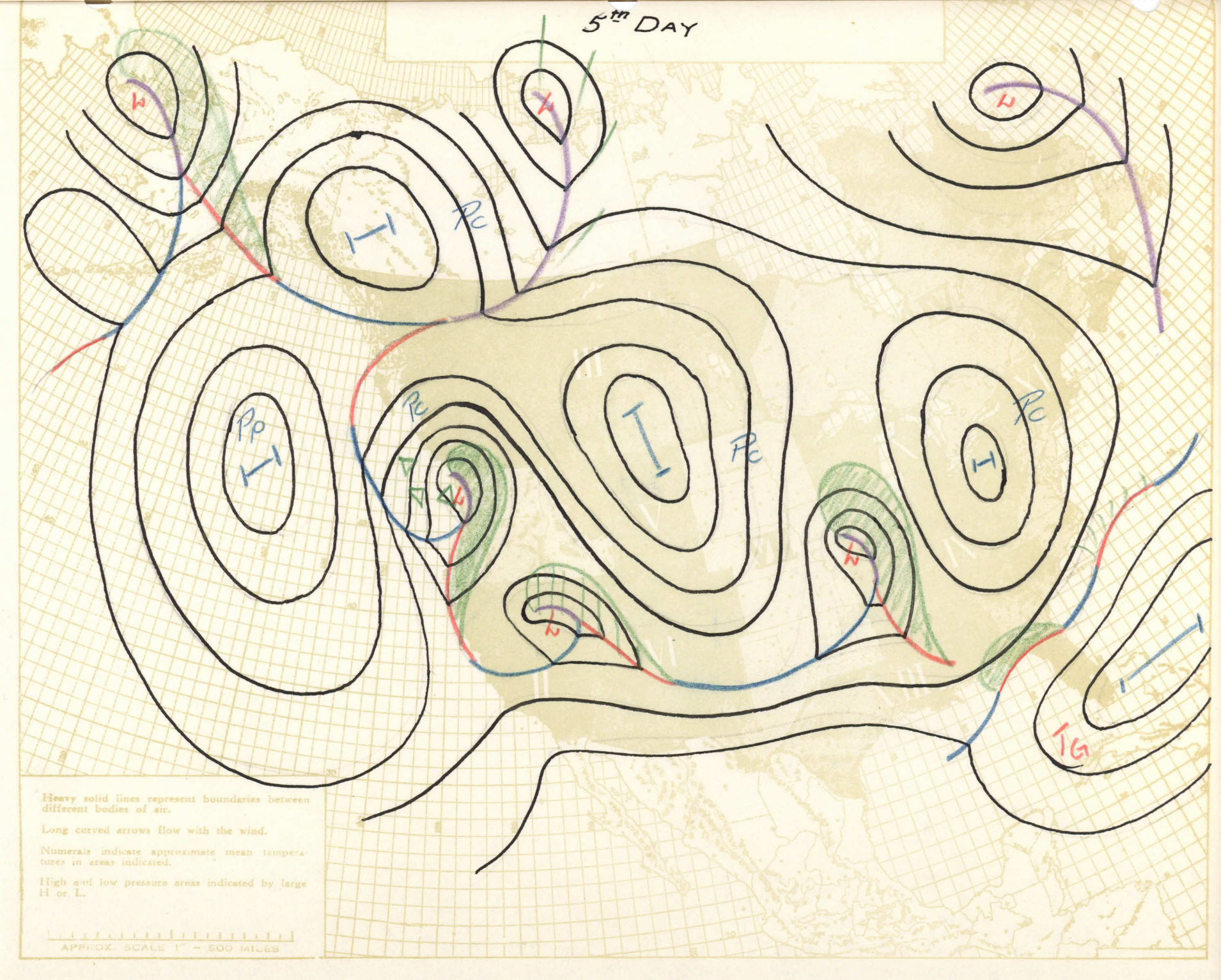
Heavy solid lines represent boundaries between different bodies of air.

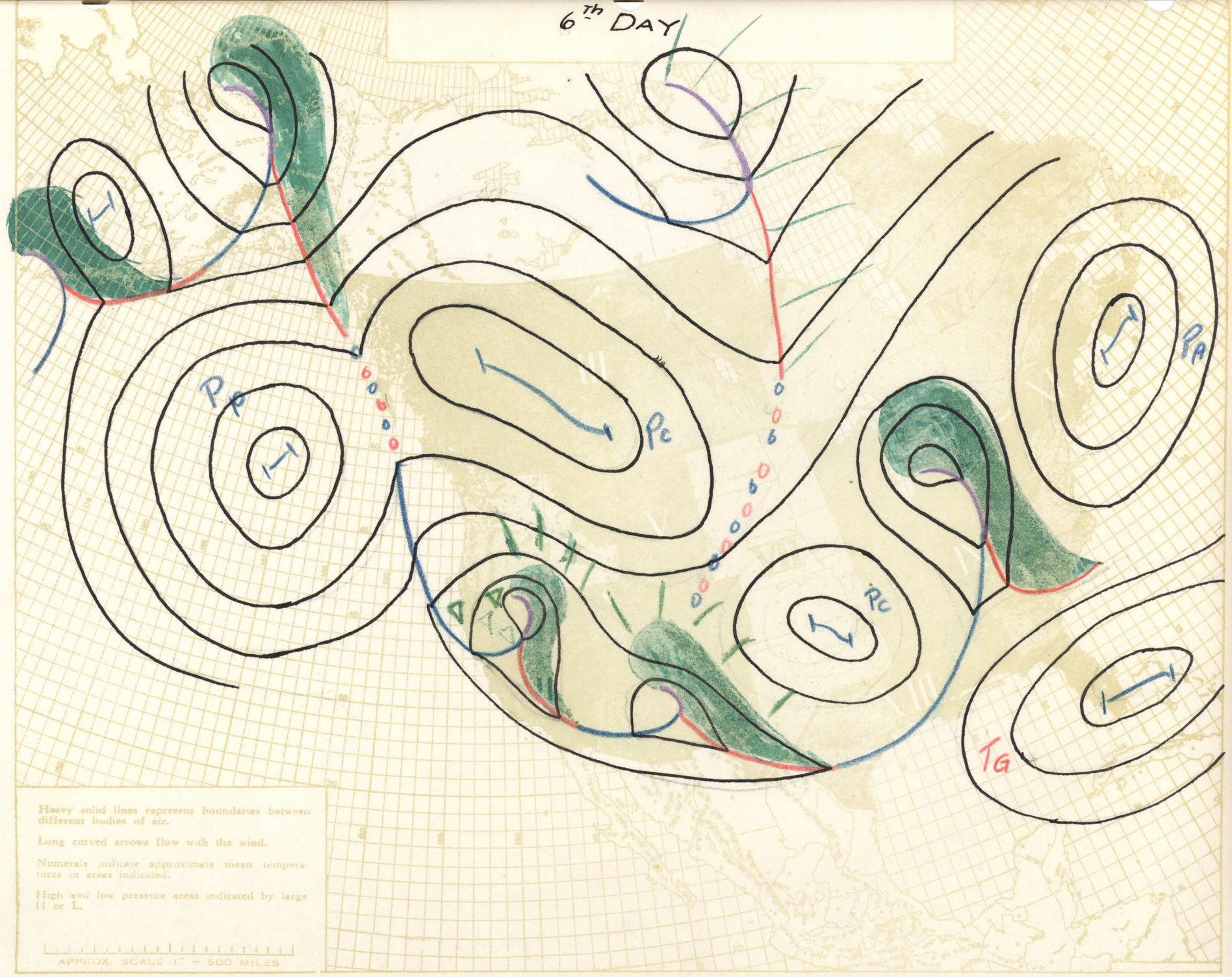
Long curved arrows flow with the wind.

Numerals indicate approximate mean temperatures in areas indicated.

High and low pressure areas indicated by large H or L.

APPROX. SCALE 1" = 500 MILES


5th DAY
Heavy solid lines represent boundaries between different bodies of air.
Long curved arrows flow with the wind.
Numerals indicate approximate mean temperatures in areas indicated.
High and low pressure areas indicated by large H or L.
APPROX. SCALE 1" – 500 MILES


6th DAY
Pp
Pc
Pc
Pa
TG
Heavy solid lines represent boundaries between different bodies of air.
Long curved arrows flow with the wind.
Numerals indicate approximate mean temperatures in areas indicated.
High and low pressure areas indicated by large H or L.
APPROX. SCALE 1" = 500 MILES

TYPE "A"

The Type "A" as has been previously stated represents a situation where the Pacific high is north and west of its normal position and greatly intensified, possibly due to its northward movement. Accompanying this translation of the Pacific high is also a translation westward of the Bermuda high and an intensification of this cell. See diagram number 1. Between these two and to the north is the migratory Canadian high moved westward. Its intensity is quite variable and it is subject to large southward movements. Its main feature in this case is its westward displacement.

In tracing this type the principal translatory feature is the movement of a high pressure area which forms west of the Alaskan peninsula. When it moves north of the periphery of the Pacific high it is subject to intensification by the extremely cold air from the Arctic regions. The first phase or day of the type being taken as the day this anticyclone comes onto the Alaskan Peninsula and intensifies. The second day the high moves east and south into British Columbia, the air in the mass at this point is the coldest of its entire cycle.

The third day the anticyclone moves extremely rapidly southward and eastward pushing a lobe of high pressure as far eastward as the Great Plains area. This day the anticyclone splits into two lobes.

The fourth day the western lobe of the anticyclone practically stagnates for one day before following the advance lobe in the Rocky - Sierra Nevada Region, while the eastern lobe pushes on east and south beyondthe Mississippi into the southeastern United States.

On the fifth and sixth days days it moves north and eastward along the Appalachians and coastal strip recurving east and south after

passing off the coast in the New England area. On the seventh day this amalgamated with the Bermuda high increasing its intensity and westward movement.

On the sixth day the new cycle starts again off the Alaskan coast. The movement of the anticyclone as described above is almost invariable. Its intensity shortly after inception appears to be a measure of the intensity of the storm cycle and southward swing of its path. The more intense it is the farther south it moves, especially after passing the Rockies. The intensification of the Bermuda high on the seventh day of the old cycle (first day of the new cycle if Type "A" persists) appears to be a result of this feature.

The cycle is from five and one half to six and one half days in length. The suggested Type "A" maps which accompany this section of the thesis are based on a six day cycle with twenty-four hours between successive phases.

So far in the discussion of the new Type "A" only the anticyclone has been traced but the cyclones and fronts formed seem to be dynamical results of this movement. They will be traced now.

The Pacific anticyclone forces fronts and cyclones to pass far north of their usual path in other types, and then to recurve southward along the Pacific coast so as always to be between the vastly contrasting Pc air of the migratory anticyclone and the Pp air of the stationary Pacific anticyclone.

The cold air being on the left of an observer facing southward gives the convective component in the same direction as the dynamic component and the wave remains stable as it move rapidly southward as far as the Los Angeles area. Here it slows up and occludes as it moves eastward,with additional waves forming along its trajectory. When the translatory anticyclone splits a tongue of the occlusion is drawn northward into the space between the east and west lobes.

The lower part is often intensified by the introduction of Tg into the wave and the cyclone follows the advance lobe of the high northward giving heavy rains northward along the Appalachians and Great Lakes and finally passes offthe coast after giving considerable precipitation in the New England area.

There is an almost stationary front extending from British Columbia south and around the southern part of the United States along the Gulf and Atlantic areas. It is along this fromt that the waves form with one major wave forming in each six day cycle and a minor wave each half cycle. The front along the Atlantic coast moves east and west under the opposing influences of the Bermuda high and the Pc outbreaks. It is along this same front that almost constant activity takes place. This is the feature which gave the floods in January 1937. The Bermuda high throws Ta and Tg air into the United States (along the Appalachians and Chioand Mississippi River Valleys)which overruns the cold Pc to the west. Since this position of the Bermuda high is typical of Type "A" any persistence of the type for several cycleswill again these flood conditions bring.

The weather anomalies connected with this type may be briefly stated since the type is so invariable. The extreme west coast will be much colder and wetter than normal with extremely dry cold weather characterizing the Columbia Plateau, Great Basin area, and Northern Great plains area. The southwestern Desert area will be colder and much wetter than normal. In the Mississippi Valley and eastward to the Atlantic coastal area there will be heavy rains and a narrow belt of almost constant rain along the Appalachians and just to the west. The temperatures will be above normal due to the Tg and Ta influx between Pc outbreaks. The Great Lakes area will be subjected to heavy rains particularly in the eastern parts. Temperatures here will average above normal. The New England area will also have heavy pre-

cipitation and above normal temperatures for fairly long intervals. The East coast south of New York will be drier than normal but will hhave considerably higher temperatures due to the position of the Bermuda high and frontal zone just to the west . These features are shown on diagram number two accompanying.

North of the United States and sometimes extending along its northern border a dry cyclone accompanies each cycle, but its activity is not of great importance to us except for the cloudiness along the United States - Canadian border.