In recognition of the greater relative importance in analysis and research of those reports with the highest verification, special emphasis is placed upon the verification of all isolated reports of severe storms. Also, all reports from the northern Canada geographic area, sea-level charts were verified by a spot-check of about 12 percent of reports entered. The spot check is designed to detect incorrect or multiple reporting of events or conditions. Reports entered which are verified are either as a result of questions raised on the over-all survey, or as a part of the complete check of the National Hurricane Center's original charts as they continue to be used for special research studies.

**TIME OF OBSERVATION**

The choice of the time of observation, at 1200, 1800, or 0000 GMT, was dictated by the much greater volume of data available at that hour as compared with other possible times such as 0700, or 0900 GMT. Especially in the past, the very much greater number of reports available near 1200 GMT were made once daily at Greenwich, noon GMT so that the inclusion of this time for both areas of the Northern Hemisphere, and which might make possible definite improvements in the charts year by year, also advanced by inclusion of reports made between 0600 and 1200 GMT at the Western weather stations.

**CODE AND STATION MODEL**

The International Charting Committee has been known for use on the Historical Weather Maps with but few supplemental limitations. The entire larger scale chart is designed to aid in refreshing memory of the synoptic conditions of a larger and more recent period. Students studying the maps in connection with the series of upper level charts are encouraged to compare the conditions of the reenactment over the present atmosphere, with the mere existence, and to the synoptic conditions which occur from on the charts, as well as the formation of basic charts. In addition, the maps are designed to help students in understanding the basic concepts and principles of weather forecasting. The high level charts especially will assist the meteorologist in acquiring a better understanding of the three-dimensional aspect of the atmosphere and the manner in which the upper air processes are related to surface weather conditions. These charts are intended to be used for teaching and reference purposes.

**PREPARATION OF HISTORICAL MAPS**

The plotting of these various maps, including the assembling and processing of the observations, is done in a plotting unit organized in Washington, D. C. The maps are reproduced in this form for general circulation, by the National Weather Bureau.

**ORGANIZATION OF THE PLOTTING UNIT**

The observational data on the Historical Weather Maps is organized on a systematic basis for ready reproduction. Certain facilitating functions, such as the preparation and the release of the data for plotting, are carried out on a functional basis.

**PRESSURE REDUCTIONS**

The techniques used in the preparation of the data for plotting, and the plotting itself, are based on the principles and methods of the International Charting Committee. The data is then used to produce the plotted maps.

**AIDS TO CONTINUITY**

In order to maintain the highest degree of continuity between the maps, certain practices were followed. In general, the maps are made to serve as a guide to the rapid analysis of weather conditions. The maps are also used to teach students about the principles of weather forecasting.

(a) Anticipating frontogenesis. A map on which frontogenesis was not apparent, but was predicted, was used in the analysis. One example of this was a map on which a short period of high pressure was encountered in certain regions, which was followed by a change in pressure and change in the direction of the wind at the time of observation. Several different maps were used, and the times at which the fronts were encountered were noted on each map.

(b) Prolonging frontolysis. This practice consists of indicating a front undergoing frontolysis on a map where there was no indication of any of the fronts of the previous front. This was done by assuming that the front was present and that it was following along the same line as the previous front. The practice was continued for several days in order to show the tendency of the fronts to follow the same path. This was done in order to show the tendency of the fronts to follow the same path.

(c) Anticipating wave formation on a front. Occasionally there were instances where the shape of the waves seemed to have changed. These changes in shape were noted, and the times at which the changes occurred were indicated on the map. In these cases it was assumed that the fronts were following a new path, and that the shape of the waves was changing accordingly.

(d) Consolidation of fronts. When two fronts of similar type were found to be in close proximity, they were combined into a single front. This practice was continued for several days in order to show the tendency of the fronts to combine. This was done in order to show the tendency of the fronts to combine.
this sort on the maps will be found occurring between: Two cold fronts, two occluded fronts, one cold and one occluded front, or two warm fronts.

(3) Transition of occluded fronts. In numerous instances, an occluded front on one map was changed to a cold front or to a warm front on the subsequent map. In performing this transformation it has been assumed that one or the other of the frontal surfaces of the occlusion was destroyed and the remaining surface was intensified by renewed frontal processes.

(c) Transition of cold fronts to occlusions. A number of cases will be found on these maps where a cold front has apparently been transformed into an occluded front for a part of its extent. In most of these cases it is believed that this case or the other of the frontal surface of the occlusion was destroyed.
SYMBOL TT—AIR TEMPERATURE
SYMBOL T.T.—DEWPOINT TEMPERATURE
All temperatures are entered in whole degrees of the Fahrenheit scale. Missing air temperatures are indicated by "M," only if TT. is also reported; otherwise no indication is made.

SYMBOL W—WATER TEMPERATURE
Water temperatures are entered in whole degrees of the Fahrenheit scale and are obtained directly from TW, the coded difference between air and water temperature. The following values are used for TW:

<table>
<thead>
<tr>
<th>Code</th>
<th>TW Difference, °F</th>
<th>Code</th>
<th>TW Difference, °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>−10</td>
<td>5</td>
<td>+1</td>
</tr>
<tr>
<td>1</td>
<td>−8</td>
<td>6</td>
<td>+2</td>
</tr>
<tr>
<td>2</td>
<td>−5</td>
<td>7</td>
<td>+3</td>
</tr>
<tr>
<td>3</td>
<td>−2</td>
<td>8</td>
<td>+4</td>
</tr>
<tr>
<td>4</td>
<td>−1</td>
<td>9</td>
<td>+5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>+6</td>
</tr>
</tbody>
</table>

The difference is applied to air temperature to obtain water temperature.

SYMBOL V—HORIZONTAL VISIBILITY
The speed of ship's movement is entered in knots near the arrow indicating ship's direction (to). The symbol ( indicates no movement, or "hove to.

SYMBOL W—PAST WEATHER

<table>
<thead>
<tr>
<th>Code</th>
<th>Figure</th>
<th>Weather</th>
<th>Visibility in miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Clear, or scattered clouds.</td>
<td>Fog, or thick haze (visibility less than 1,000 meters, 3,300 yards)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Broken not cloudy or variable sky.</td>
<td>Drizzle</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Overcast.</td>
<td>Rain</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sandstorm or duststorm, or storm of drifting snow.</td>
<td>Snow showers</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Fog</td>
<td></td>
</tr>
</tbody>
</table>

SYMBOL WW—PRESENT WEATHER
Note—In coding present weather the highest code figure in complete table applicable to weather at time of observation is used.

Figures 00 to 19: Abbreviated description of sky and special phenomena
00 Clear (from no clouds up to but not including 2°F)
01 Fairly cloudy (from exactly 2°F to exactly 5°F)
02 Cloudy (over 5°F up to and including exactly 10°F)
03 Overcast (over 10°F)
04 Low fog, whether on ground or at sea
05 Haze (but visibility 1,000 meters, 3,300 yards or more)
06 Dust devils seen
07 Dust falling
08 Light fog (visibility 1,000 meters, 3,300 yards or more)
09 Fog at a distance, but not at station (or ship)
10 Precipitation within sight
11 Thunder, without precipitation at station (or ship)
12 Duststorm within sight, but not at station (or ship)
13 Light, threatening sky
14 Squally weather
15 Heavy squalls in last 2 hours
16 Waterspouts seen in last 3 hours
17 Visibility reduced by smoke
18 Blowing dust (visibility 1,000 meters, 3,300 yards or more)
19 Signs of tropical storm or hurricane.

Figures 20 to 29: Precipitation in last hour (but not at time of observation)
20 Precipitation in any form
21 Drizzle
22 Continuous or intermittent rain
23 Continuous or intermittent snow
24 Continuous or intermittent rain and snow, mixed
25 Rain showers
26 Snow showers
27 High, or rain and hail, showers
28 Light or moderate drizzle and rain
29 Heavy drizzle and rain

Figures 30 to 39: Duststorms and storms of drifting snow (Visibility less than 1,000 meters, 3,300 yards)
30 Duststorm or sandstorm
31 Duststorm or sandstorm has decreased
32 Duststorm or sandstorm, no appreciable change
33 Duststorm or sandstorm has increased
34 Light of sandstorm
35 Storm of drifting snow
36 Light or moderate storm of drifting snow
37 Heavy of drifting snow
38 Light or moderate storm of drifting snow
39 Heavy storm of drifting snow

Figures 40 to 49: Fog
(Visibility less than 1,000 meters, 3,300 yards)
40 Fog
41 Moderate fog in last hour
42 Thick or dense fog in last hour
43 Fog, sky visible
44 Fog, sky not discernible
45 Fog, sky visible
46 Fog, sky not discernible
47 Fog, sky visible
48 Fog, sky not discernible
49 Fog in patches

Figures 50 to 59: Drizzle
50 Drizzle
51 Intermittent drizzle
52 Continuous drizzle
53 Intermittent drizzle
54 Continuous drizzle
55 Intermittent drizzle
56 Continuous drizzle
57 Drizzle and Fog
58 Light or moderate drizzle and rain
59 Heavy drizzle and light rain

Figures 60 to 69: Rain
60 Rain
61 Intermittent rain
62 Continuous rain
63 Intermittent rain
64 Continuous rain
65 Intermittent rain
66 Continuous rain
67 Rain and fog
68 Light or moderate rain and snow, mixed
69 Heavy rain and snow, mixed

Figures 70 to 79: Snow
70 Snow
71 Continuous snow
72 Continuous snow
73 Continuous snow
74 Continuous snow
75 Continuous snow
76 Continuous snow
77 Heavy snow and fog
78 Snow graupel
79 Snow crystals or sleet

Figures 80 to 89: Showers
80 Showers
81 Showers of light or moderate rain
82 Showers of heavy rain
83 Showers of light or moderate snow
84 Showers of heavy snow
85 Showers of light or moderate rain and snow
86 Showers of heavy rain and snow
87 Showers of snow pellets
88 Showers of light or moderate hail, or rain
89 Showers of light or moderate hail, or rain

SYMBOL BR—PRECIPITATION
The amount of precipitation is given in inches, to the nearest hundredth, for the 11 to 13-hour period ending at time of observation. Some sources report for other periods, as indicated in the description of specific sources.

ADDITIONAL SYMBOLS
1. Parentheses enclose pressures or temperatures obtained by interpolation from isopleths drawn on previously prepared maps.
2. Brackets enclose pressure values for stations above 100 meters for which reduction to sea-level was made in the plotting unit.
3. The symbol (Ma) indicates reports from Cavite or similar wireless reports.
4. On ship reports the abbreviated name of the ship is entered below the report.

PRECIPITATION SYMBOLS

SOLID ISOBARS FOR EACH 5 MILLIBAR INTERVAL WHERE PRESSURE VALUES ARE REASONABLY CERTAIN.

DASHED ISOBARS FOR EACH 5 MILLIBAR INTERVAL WHERE PRESSURE FIELD IS UNCERTAIN.

ALTERNATE DASH AND DOT FOR INTERMEDIATE VALUES OF TWO MILLIBARS IN REGIONS OF EXTREMELY FLAT PRESSURE FIELDS.

AIR MASS DESIGNATORS

MP POLAR MARITIME
CP POLAR CONTINENTAL
MT TROPICAL MARITIME
CT TROPICAL CONTINENTAL
CA ARCTIC CONTINENTAL

SYMBOLS USED FOR DESIGNATING FRONTS:

COLD FRONT
WARM FRONT
OCCCLUDED FRONT
STATIONARY FRONT
COLD FRONTogenesis
WARM FRONTogenesis
STATIONARY FRONTogenesis
COLD FRONTOLYSIS
WARM FRONTOLYSIS
OCCCLUDED FRONTOLYSIS
STATIONARY FRONTOLYSIS
COLD FRONT ALTOFRONT
WARM FRONT ALTOFRONT
OCCCLUDED FRONT ALTOFRONT
OCCCLUDED FRONTOLYSIS ALTOFRONT

HATCHING DENOTES AREA OF PRECIPITATION (other than drizzle) OR GENERAL AREA OF MIXED PRECIPITATION TYPES.